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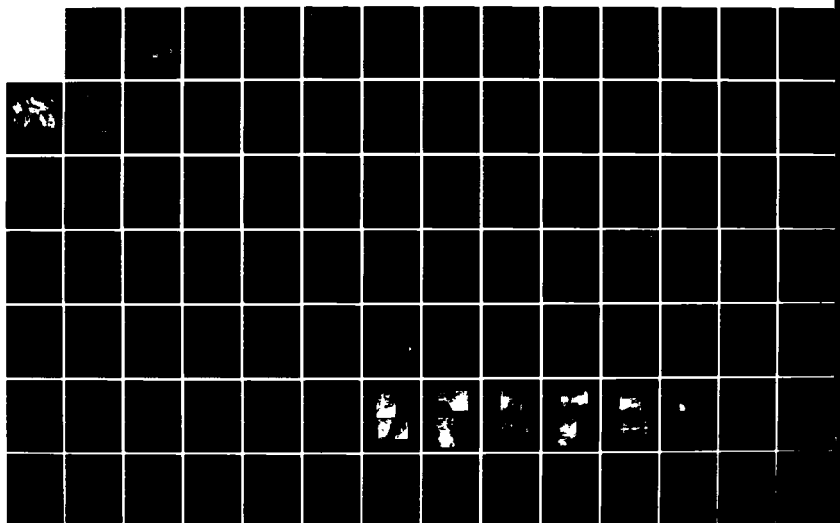
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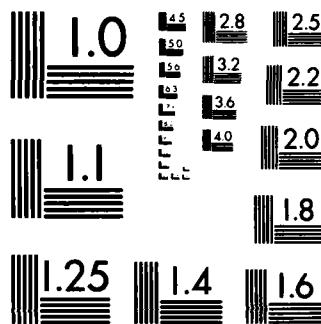
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**CONNECTICUT RIVER BASIN
CHARLEMONT, MASS.**

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**J. A. WELLS UPPER DAM
MA 01268**

**PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM**



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REPLY TO
ATTENTION OF:
NEDED

Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts 02133

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Dear Governor King:

Inclosed is a copy of the J.A. Wells Upper Dam (MA-01268) Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Quality Engineering, the cooperating agency for the Commonwealth of Massachusetts. In addition, a copy of the report has also been furnished the owner, Board of Trustees, Charlemont Fire District, Charlemont, Mass.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Quality Engineering for your cooperation in carrying out this program.

Sincerely,

WILLIAM E. HODGSON, JR.
Colonel, Corps of Engineers
Acting Division Engineer

Incl
As stated

J. A. WELLS UPPER DAM

MA 01268

CONNECTICUT RIVER BASIN
CHARLEMONT, MASSACHUSETTS

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.: MA 01268
Name of Dam: J.A. WELLS UPPER DAM
Town: CHARLEMONT
County and State: FRANKLIN, MASSACHUSETTS
Stream: MILL BROOK
Date of Inspection: 9 MAY 1980

BRIEF ASSESSMENT

The J.A. Wells Upper Dam is a stone masonry gravity dam having a hydraulic height of 26 feet, 100 feet long, 9 feet wide at the crest, and a vertical downstream face. The central overflow spillway section of the dam is 44 feet and is 3 feet lower than the top of dam. At the southeast abutment there is a stone training wall which varies between 2 and 3 feet higher than the top of dam. A 20 inch iron pipe with a wooden intake structure is located at the southeast abutment, the pipe extends downstream into the village of Charlemont and is part of a fire supply system. The dam impounds a small reservoir which is now almost completely full of sediment. The reservoir has a maximum storage capacity at the top of the training wall of 16 acre feet without silt. The normal reservoir is approximately one acre and is part of a fire supply for the village of Charlemont which is located 1400 feet downstream. Significant structures located below the dam include a bridge at Route 2, houses, a fire station, town garage, and an elementary school

The fire station, town garage and the elementary school all lie in the floodplain of the Deerfield River as shown in Appendix C, Figure 11.

The dam is in poor condition and it appears that maintenance of the structure has been neglected. Major concerns are instability of the structure as noted by horizontal displacements up to 6 inches at both ends of the dam, sloughing of the slope immediately downstream of the southeast abutment and low hydraulic capacity of the spillway which could cause excess water to undermine the abutments of the Bissell Covered Bridge.

Based on small size and high hazard classification in accordance with Corps guidelines, the test flood range is from 50% to 100% of the Probable Maximum Flood (PMF). Because of the small storage capacity $\frac{1}{2}$ PMF was selected as the test flood. The test flood inflow for J.A. Wells Upper Dam having a drainage area of 12.1 square miles was determined to be 11,000 cfs which would overtop the dam by 9.5 feet. Spillway capacity at the top of dam is 750 cfs which is 7 percent of the test flood discharge.

Assuming that the floodplain of the Deerfield River is not already inundated, a major breach at the top of dam would cause flooding of 2 to 3 feet in the area near the downstream elementary school. Flows preceding the

breach (antecedent flows) would probably cause basement flooding at the school and the area near the fire station and the town garage would probably be about 1 foot prior to the assumed breach. The flood wave would cause an additional 2 to 3 feet of flooding.

The owner, the Charlemont Fire District should implement the results of the recommendations and remedial measures given in Sections 7.2 and 7.3 within one year after receipt of this Phase I Inspection Report.

The recommendations in general are that the owner should engage a qualified Registered Professional Engineer to:

- Design procedures to lower the spillway crest in order to reduce the danger of overtopping and potential damage to the abutments of the Bissell Covered Bridge.
- Investigate the movement of the dam and recommend measures to make it structurally stable.
- Investigate the slope failure on the left abutment below dam and recommend measures to stabilize it.
- Repair all dislodged and displaced masonry.
- Inspect spillway under no flow.
- Design repairs to sluice gates and operators.

The owner should also implement the recommended remedial program including the clearing and maintenance of the downstream channel, the establishment of a formal surveillance and warning program and a formal operation and maintenance program, and should engage a qualified Registered Professional Engineer to perform a technical inspection every year.



John F. Cysz
John F. Cysz
Project Manager
MA P.E. No. 28841

This Phase I Inspection Report on J.A. Wells Upper Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Richard J. DiBenedetto

RICHARD DIBENEDETTO, MEMBER
Water Control Branch
Engineering Division

Aramant Mantesian

ARAMANT MANTESIAN, CHAIRMAN
Geotechnical Engineering Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of the Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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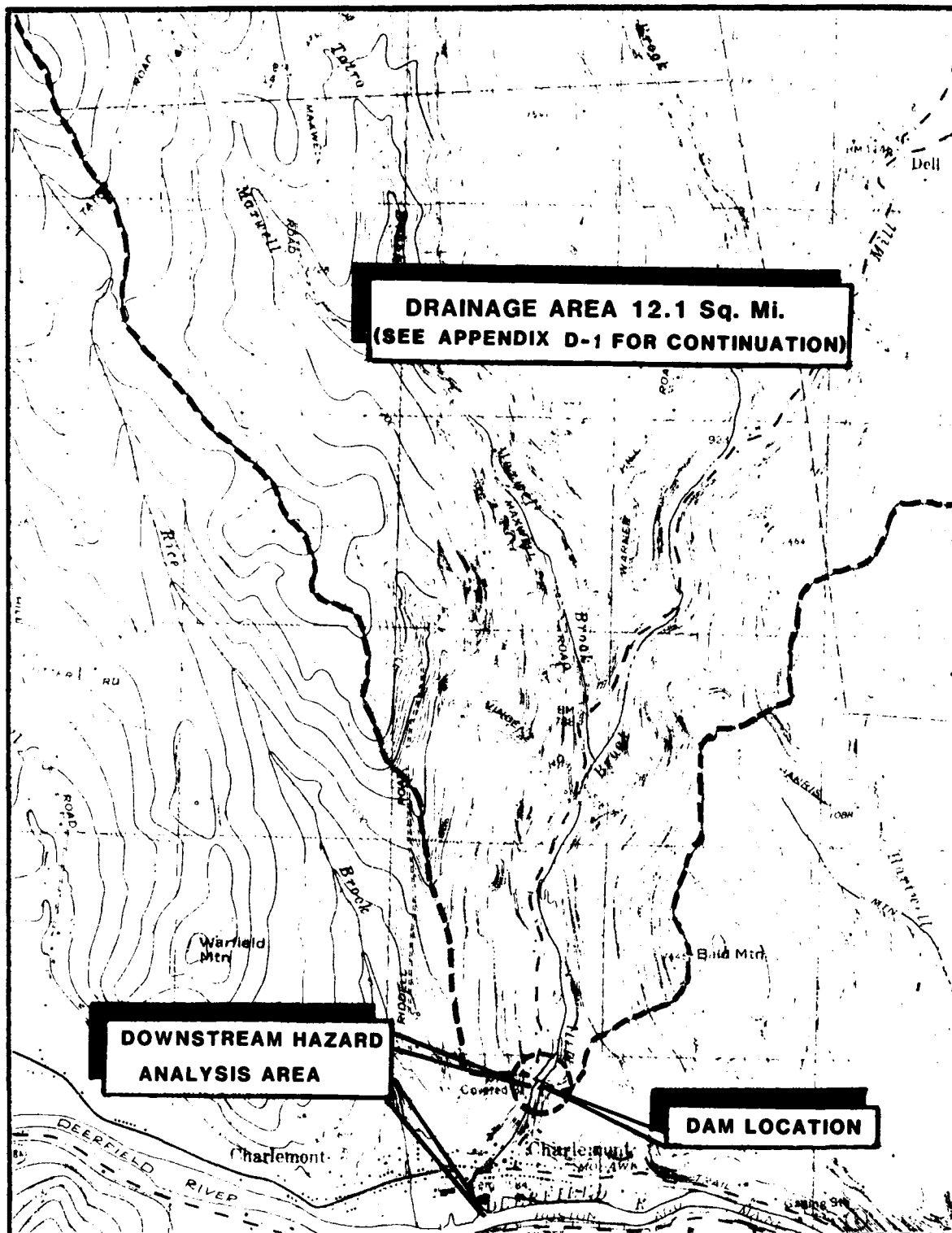
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OVERVIEW OF
J. A. WELLS UPPER DAM



J.A.WELLS UPPER DAM
CHARLEMONT, MASS.

Identification No. MA 01268



Heath Quadrangle

1:25000

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
J.A. WELLS UPPER DAM
PROJECT INFORMATION

1.1 GENERAL

a. Authority

Public Law 92-367, August 8, 1972 authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Robert G. Brown & Associates, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Massachusetts. Authorization and notice to proceed were issued to Robert G. Brown & Associates, Inc. under a letter of 14 March 1980 from William E. Hodgson, Colonel, Corps of Engineers. Contract No. DACW33-80-C-0037 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection

- (1) To perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.
- (2) To encourage and prepare the States to initiate quickly effective dam safety programs for non-Federal dams.
- (3) To update, verify and complete the National Inventory of dams.

1.2 DESCRIPTION OF PROJECT

a. Location

J.A. Wells Upper Dam is located in the Town of Charlemont, Massachusetts. The dam spans Mill Brook approximately 2400 feet upstream from where Mill Brook enters the Deerfield River. After discharging at the damsite, Mill Brook flows through a rock gorge and passes under Route 2 in the village of Charlemont, 1400 feet downstream. J.A. Wells Upper Dam is shown on the USGS Heath, Massachusetts, Vermont Quadrangle at Latitude 42° 37.9' and Longitude 72° 52.1'.

b. Description of Dam and Appurtenances

The J.A. Wells Upper Dam is a stone masonry gravity dam having a hydraulic height of 26 feet, 95 feet long, 9 feet wide at the crest, and a vertical downstream face. The central overflow spillway section of the dam is 44 feet and is 3 feet lower than the top of the dam. At the southeast abutment there is a stone training wall which varies between 2 and 3 feet higher than the top of dam. This training wall appears to be of newer construction than the dam. The dam has two sluiceways; a 1.5 foot by 2 foot sluice near the southeast end of the dam is 21 feet below the top of the dam,

and a 3.5 foot by 3 foot sluiceway at the northwesterly end of the dam is located 14 feet below the top of dam. Both sluiceways are equipped with a wooden sluice gate at the upstream face of the dam. At present neither sluice gate can be operated.

Schistose bedrock outcrops at both abutments and in the channel immediately downstream of the dam indicate that the dam is founded on bedrock.

c. Size Classification

Small. Hydraulic height 26 feet, storage - 10 acre feet based on height and storage (25 to 40 feet, 50 to 1000 acre feet) as given in the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

High Hazard, a major break, could cause appreciable property damage in the village of Charlemont and possible loss of more than a few lives. (See Section 5.5) Failure of the dam could undermine the abutments of the wooden covered bridge and the foundation of a residence immediately downstream of the dam. Blockage of the Route 2 bridge opening by debris, including that from the wooden covered bridge and a residence downstream of the covered bridge, could direct water over the road into a residential area. An elementary school would also be flooded by a major break in the dam.

e. Ownership

The current owner of the dam is the Board of Trustees, Charlemont Fire District, Charlemont, MA 01339, telephone number (413) 339-4796. The dam was purchased by the Fire District in 1963.

f. Operator

The owner is responsible for operation of the dam.

g. Purpose of Dam

The dam was formerly part of a water supply and hydropower system which served downstream mills. A fire hydrant system in the village of Charlemont is served by the 20 inch pipe originating at the dam. The condition of several of the fire hydrants and the reservoir itself indicate that the fire system could not function dependably without major improvements to the system. There may also be some water supply connections to the 20 inch pipe.

h. Design and Construction History

No information regarding the original design or construction of the dam was available.

i. Normal Operating Procedure

Conditions at the damsite indicate that maintenance of the dam has been abandoned. Repairs to the dam were made around 1974. The repair work included removal of sediment from the reservoir, repair of sluice gates, and repairs to stone masonry near the northwesterly abutment including rebuilding of the roof of the sluiceway at the northwest end of the dam.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area consists of 12.1 square miles of mostly wooded, mountainous terrain having steep slopes. Three tributaries join Mill Brook upstream of the damsite. These tributaries are Maxwell Brook, Davis Mine Brook and Heath Brook. There are no significant sized man-made or natural waterbodies in the watershed. The drainage area is sparsely developed.

Elevations range from 643 MSL at the damsite to elevation 2100 MSL on the fringe of the watershed (Adams Mtn.). The drainage area, having a maximum length of 5.68 miles, extends into the towns of Rowe, Heath, and Charlemont.

b. Discharge at Damsite

- (1) Outlet works - 20 inch iron pipe at southeast end of dam. The pipe is controlled by a gate valve near downstream face of dam. The inlet is approximately 7 feet below spillway level. (Invert elevation approximately 636 MSL). Discharge capacity 35 cfs with water at top of dam.
- (2) The maximum known flood at damsite was 5460 cfs in 1938 as reported by the USGS.
- (3) Ungated spillway (principal) capacity @ top of dam elevation @ 750 cfs @ 646 MSL.
- (4) Ungated spillway capacity @ test flood elevation - 6400 cfs @ 655.5 MSL.
- (5) Gated spillway capacity @ normal pool elevation - not applicable.
- (6) Gated spillway capacity @ test flood elevation - not applicable.
- (7) Total spillway capacity @ test flood elevation - 6400 cfs @ 655.5 MSL.
- (8) Total project discharge @ top of dam - 750 cfs @ 646 MSL.
- (9) Total project discharge @ test flood elevation - 11,000 cfs @ 655.5 MSL.

c. Elevation (feet above MSL; see (6) next page)

- (1) Streambed at centerline of dam - 622 (at downstream toe).
- (2) Bottom of cutoff - not applicable.
- (3) Maximum tailwater - unknown.

- (4) Normal pool - 643.
- (5) Full flood control pool - not applicable.
- (6) Spillway crest - 643 (interpolated from USGS Quadrangle sheet). Note: Approximately 50 percent of the spillway crest is eroded below this original crest elevation.
- (7) Design surcharge (original design) - unknown.
- (8) Top of dam - 646. (Average)
- (9) Top of training wall - 648.5 (average).
- (10) Test flood surcharge - 655.5.
- d. Reservoir (length in feet)
 - (1) Length of normal pool - 320.
 - (2) Length of flood control pool - not applicable.
 - (3) Length of spillway crest pool - 320.
 - (4) Length of top of dam pool - 450.
 - (5) Length of test flood pool - 700.
- e. Storage (acre-feet)
 - (1) Normal pool - 1.5 (with silt) 4 (without silt).
 - (2) Flood control pool - not applicable.
 - (3) Spillway crest pool - 1.5 (with silt) 4 (without silt).
 - (4) Top of dam - 6 (with silt) 9 (without silt).
 - (5) Top of training wall 13 (with silt) 16 (without silt).
 - (6) Test flood pool - 42 (with silt) 44 (without silt).
- f. Reservoir Surface (acres)
 - (1) Normal pool - 1.
 - (2) Flood Control Spillway - not applicable.
 - (3) Spillway crest - 1.

- (4) Top of dam - 2.
 - (5) Top of training wall - 3.5.
 - (6) Test flood pool - 8.
- g. Dam
- (1) Type - stone masonry gravity.
 - (2) Length - 100.
 - (3) Height - 26' hydraulic height.
 - (4) Top width - 9'.
 - (5) Side slopes - upstream - not visible.
- downstream - vertical.
 - (6) Zoning - not applicable.
 - (7) Impervious core - not applicable.
 - (8) Cutoff - dam founded on bedrock.
 - (9) Grout curtain - none.
- h. Diversion and Regulating Tunnel - not applicable.
(See j. below)
- i. Spillway
- (1) Type - stone masonry now partially eroded.
 - (2) Length of weir - 44'.
 - (3) Crest elevation - 643 MSL.
 - (4) Gates - none.
 - (5) U/S Channel - Mill Brook - silted in behind dam.
 - (6) D/S Channel - Mill Brook contained in rock gorge beneath Bissell Covered Bridge.
- j. Regulating Outlets
- (1) 1.5' by 2' stone sluiceway with wooden gate (no gate operator) at southeast end of dam. Approximate invert elevation 625 MSL.
 - (2) 3' by 3.5' stone sluiceway (partially collapsed) with wooden gate (wood gate operator broken, see Appendix C, Figure 4) at northwest end of dam. Approximate invert elevation 632 MSL.

SECTION 2
ENGINEERING DATA

2.1 DESIGN DATA

No design data were available for J.A. Wells Upper Dam.

2.2 CONSTRUCTION DATA

No construction records were available.

2.3 OPERATION DATA

No engineering operational data were obtained.

2.4 EVALUATION OF DATA

a. Availability

Sketches and previous inspection reports by the Massachusetts Department of Public Works and the County Engineer are available. (See Appendix 3-2) Direct contact with the Charlemont Fire District revealed no plans or written engineering data.

b. Adequacy

The final assessments and recommendations of this investigation are based on the visual inspection and the hydrologic and hydraulic calculations.

c. Validity

No engineering data were disclosed to validate. Sketches on file with the Massachusetts Department of Public Works adequately represent the structure.

SECTION 3 VISUAL INSPECTION

3.1 FINDINGS

a. General

J.A. Wells Upper Dam was inspected on May 9, 1980. At the time of the inspection water was flowing over the spillway at an average depth of approximately 8 inches over the southeast half of the crest. The reservoir behind the dam is presently silted-in to within 18 inches of the spillway crest.

b. Dam

The J.A. Wells Upper Dam is a stone masonry gravity dam having a hydraulic height of 26 feet, 100 feet long and 9 feet wide at the crest. The downstream face of the dam is in poor horizontal and vertical alignment. The dam is leaning forward as much as 6 inches at both ends. The stone masonry above the 3' by 3.5' sluiceway at the northwest end is partially collapsed (see Appendix C, Figure 2). According to previous inspection reports prepared by the Massachusetts Department of Public Works, (see Appendix B) this is a reoccurrence of a previous condition which was repaired around 1974. The reoccurrence of this partial collapse indicates movements in the face of the dam. The dam is founded on schistose bedrock which is exposed at both abutments and in the bottom of the channel immediately downstream of the dam.

The crest of the spillway has become eroded for approximately 50 percent of its length. Water has washed several of the original spillway capstones over the dam causing an irregular vertical alignment of the spillway crest (see Appendix 3-3, Section A-A).

Missing stones at the southeast end of the spillway have caused spillway flow to be diverted toward the southeast abutment which has caused sloughing of the slope and undermining of the 20 inch water pipe. This condition is shown by Appendix C, Figures 1 and 3. One large stone has fallen onto the 20 inch iron pipe as can be noted in the photograph. A timber pole retaining wall appears to have been placed along side of the water main to retain the earth slope; however, it too has become undermined.

A stone training wall at the southeast abutment appears to be of more recent construction than the dam because the stones in the training wall are set in mortar. The stone masonry in the dam is dry laid. The top of the training wall varies in elevation from 1 foot to 3.5 feet above the top of dam. Small brush is growing out of the sides and top of the dam.

The sluice gate operator for the 3 foot by 3.5 foot wooden sluice gate at the northwest end of the dam is shown in Appendix C, Figure 4. The gate is no longer operable due to the broken gate stem which is constructed of timber. There is no operating mechanism for the 1.5 foot by 2 foot sluice gate at the southeast end of the dam although a 3/8 inch steel cable visible at the spillway above the sluice gate appears to be for the purpose of raising the gate.

c. Appurtenant Structures

A wooden trash rack is positioned at the inlet to the 20 inch water pipe at the southeast end of the dam. The wooden inlet structure is approximately 7 feet long and 4 feet wide. The structure contains slots for stop logs; however, there are no stop logs. The top of the wooden inlet is approximately 6 feet below the top of dam. The bottom portion of the inlet structure is covered by silt.

d. Reservoir Area

The reservoir area behind the dam is now almost completely silted in as can be seen in Appendix C, Figure 5. Heavier deposits of gravel and cobbles are present at the upstream end of the reservoir area as shown in Appendix C, Figure 6. Brush and trees have become established in these deposits. The gravel deposits and trees collect debris washed down by Mill Brook. During high flows, backwater causes basement flooding of one house located approximately 700 feet upstream of the dam.

e. Downstream Channel

The Bissell Covered Bridge is located within 20 feet of the northwest abutment of the dam (see Appendix B-3). Overtopping of the dam would jeopardize the abutments of the bridge. This bridge is a replacement of the covered bridge damaged during the flood of 1938. The new bridge was built during the early 1950's. The channel immediately downstream of the dam and the Bissell Covered Bridge is a steep walled narrow rock gorge with a steep channel gradient.

Approximately 500 feet downstream of the dam there is a wooden building which is a former mill. The structure is now being converted into a residence. A part of the stone foundation of this building lies in the stream and there is evidence of previous damage to the foundation wall. This building lies at the outlet of the rock gorge and is shown in Appendix C, Figures 7 and 8.

Beyond the gorge the channel gradient becomes less steep and has a generally uniform slope to the bridge crossing at Route 2, 1400 feet downstream of the dam. The channel bottom is gravel and cobbles, with sideslopes of approximately $1\frac{1}{2}$ H to 1V. Trees overhang the channel within this reach.

After passing under the concrete stringer bridge at Route 2 in the Village of Charlemont, Mill Brook flows to the Deerfield River. Significant structures subject to flooding in this area are the fire station which houses the town's ambulance, the town garage, 2 to 3 houses near the westerly bank of the brook and an elementary school. The concrete bridge and the fire station are shown in Appendix C, Figure 9. The elementary school is shown in Figure 10. The Bissell Covered Bridge, the wooden mill building which is now being converted to a residence, and overhanging trees in the channel could contribute to blockage, during flood flow, of the channel and the opening under the Route 2 bridge in the village of Charlemont.

3.2 EVALUATION

Based on the visual inspection, the J.A. Wells Dam is in poor condition. The reservoir area is almost completely silted in. The stone masonry of the dam is in poor condition as evidenced by the eroded spillway and partial collapse of the sluiceway at the northwest end of the dam. Both ends of the dam are leaning forward as much as 6 inches. The slope downstream of the southeast abutment has failed partly as a result of water discharging from the eroded spillway. This slope failure has exposed the 20 inch water pipe and has caused undermining of the timber pole retaining wall. Water flowing from a bleeder on the 20 inch water pipe has also contributed to the unstable slope and failure of the retaining wall. A large rock is now resting on the water pipe. Neither of the sluiceways are presently operable and small trees and brush have taken root in the dam.

SECTION 4 OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES

a. General

No written operational procedures exist for J.A. Wells Upper Dam. Conditions at the damsite indicate that operation and maintenance of the dam and associated system have been neglected. The reservoir is almost entirely filled in and there would be little water available for fire fighting use particularly during a low flow period.

b. Description of any Warning System in Effect

No written warning system exists for the dam.

4.2 MAINTENANCE PROCEDURES

a. General

The owner, The Board of Trustees of the Charlemont Fire District, is responsible for the maintenance of dam.

b. Maintenance and Operating Facilities

No formal maintenance program was disclosed. The silt was removed from the reservoir around 1974. At that time repairs were made to the stone masonry, sluice gates and brush was cut from the dam. There are no records of any subsequent repairs of maintenance.

4.3 EVALUATION

The maintenance and operating procedures for the dam and appurtenances are inadequate. Recommendations and Remedial Measures are given in Section 7.

SECTION 5 EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 GENERAL

The J.A. Wells Upper Dam is a stone masonry gravity dam having a hydraulic height of 26 feet. The dam impounds a reservoir which is presently almost completely silted in. The 12.1 square mile watershed has steep slopes and rapid runoff characteristics. Available surcharge storage has a negligible effect in attenuation of flood flows. Wooden sluice gates at each end of the dam are presently inoperable. Overtopping of the dam would threaten both abutments of the Bissell Covered Bridge located immediately downstream of the dam.

5.2 DESIGN DATA

No hydrologic or hydraulic design data were found.

5.3 EXPERIENCE DATA

Flow at the dam in 1938 was 5460 cfs as reported by the USGS. No other hydrologic or hydraulic experience data for the damsite were available. Several bridges located upstream of the damsite were washed out in 1938 and the covered bridge immediately downstream of the dam was damaged in 1938 and was later condemned because of undermined abutments. The bridge at Route 2 in the village of Charlemont was also washed out in 1938 and structures in the area of the present fire house were destroyed or damaged. The elementary school was built in the 1950's and there are no reports of recent flooding at the school.

The area downstream of the Route 2 bridge lies in the floodplain of the Deerfield River.

At the time of the inspection, no visual evidence was noted of damage to the structure caused by overtopping.

5.4 TEST FLOOD ANALYSIS

The J.A. Wells Upper Dam is classified as being a small dam with a small impoundment. The dam has a hydraulic height of 26 feet and a maximum impoundment of 16 acre feet with water at the top of the training wall. The dam was determined to have a high hazard classification.

Using the Recommended Guidelines for Safety Inspection of Dams, the test flood range is between 50 percent and 100 percent of the Probable Maximum Flood (PMF). Because of the small storage capacity, the test flood was determined to be $\frac{1}{2}$ the Probable Maximum Flood (PMF).

The 1/2 PMF test flood inflow for J.A. Wells Upper Dam, having a drainage area of 12.1 square miles, was determined to be 11,000 cfs based upon the "Preliminary Guidance for Estimating Maximum Probable Discharges" provided by the Corps of Engineers. The overtopping analysis indicates that the dam would be overtopped by approximately 9.5 feet during the test flood conditions. The water depth discharging through the principal spillway would be 12.5 feet and would amount to 6,400 cfs. Spillway capacity @ top of dam (646' MSL) is 750 cfs, which is 7 percent of the test flood discharge. During test flood conditions water would be approximately 5.5 feet over the training wall at the southeast abutment. The small available surcharge storage has no significant effect in attenuating flood flows at the damsite.

5.5 DAM FAILURE ANALYSIS

The impact of failure of the dam with the water level at the top of the dam was assessed using the Guidance for Estimating Downstream Dam Failure hydrographs issued by the Corps of Engineers. The analysis covered the reach extending from the dam to the Deerfield River, a distance of 2,400 feet. A breach width of 40% of dam length at mid-height was assumed (28 feet). It was also assumed that the breach would occur with water at the top of the training wall (elevation 650.) The breach discharge was determined to be approximately 6,200 cfs. This was added to the flow over the spillway other than the breach (approximately 1000 cfs), and to the flow over the ends of the dam (400 cfs) to give a total breach discharge of approximately 7,600 cfs. The antecedent discharge (spillway capacity at top of training wall prior to breach) was determined to be approximately 3100 cfs. A major breach of J.A. Wells Upper Dam, with water at the top of training wall could cause damage to a former wooden mill building which is now a residence. This structure has a part of its foundation at the edge of the channel which could be washed out by the flood wave (see Appendix C, Figures 7 and 8). This structure, coupled with debris and overhanging trees could be carried downstream and cause blockage of the bridge opening at Route 2. This could cause damage to residences in Charlemont Village. Below the Route 2 bridge, there is a fire station, town garage and an elementary school. Just prior to the breach of the dam, both the fire station and the town garage would be flooded by Mill Brook to a depth of about 1 foot. Prior to the breach water would be about 5 feet above the level of the school basement. (See Appendix B-3, Figure 3.) The flood wave resulting from the dam breach would raise the flood level in this area an additional 2 to 3 feet. These flood levels could be higher if the Deerfield River was in flood at the time of breach.

A view of the fire station, town garage and elementary school is shown in Appendix C, Figure 11. This photograph shows that the structures lie in the floodplain of the Deerfield River.

Because of the potential for appreciable property damage and possible loss of more than a few lives, J. A. Wells Upper Dam was classified High Hazard.

SECTION 6 EVALUATION OF STRUCTURAL STABILITY

6.1 VISUAL OBSERVATIONS

The dam is in poor structural condition. The dam is leaning forward by as much as 6 inches at both ends. The partial collapse and cracks in the stones in the downstream face surrounding the sluiceway at the northwest end of the dam indicate distress and movement in the dam, possibly as a result of loads induced by sediment behind the dam. Approximately 50 percent of the spillway capstones have been washed over the dam thus concentrating most of the flow at one end of the spillway. The failed slope downstream of the southeast abutment has been partly caused by water falling over the spillway. The flow from a bleeder fitting on the 20 inch water pipe has also contributed to the slope failure in this location. Seepage is noticeable at various locations on the face of the dam. The dam is founded on bedrock and no movements were detected near the base of the dam. Small trees and brush are growing in both the top and downstream face of the dam.

6.2 DESIGN AND CONSTRUCTION DATA

No design and construction data are available for this dam. Previous inspection reports and sketches of the dam prepared by the Massachusetts Department of Public Works and the county engineer are available.

No engineering operational records were obtained. According to information contained in Massachusetts Department of Public Works files, the Charlemont Fire District took over ownership and operation of the dam around 1963.

6.3 POST-CONSTRUCTION CHANGES

No information regarding post-construction changes were available. The training wall at the southeast abutment appears to be of latter construction than the dam. The timber pole retaining wall downstream of the southeast abutment was constructed within the past 5 years. Repairs to the sluice gates and the stone masonry at the northwest end of the dam were made around 1974. The recurrence of a partial collapse of the northwest sluiceway indicates continuing movements in the face of the dam.

6.4 SEISMIC STABILITY

This dam is located in Seismic Zone 2 and, in accordance with the Phase I guidelines, does not warrant seismic analysis.

SECTION 7
ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition

The visual inspection indicates that the J.A. Wells Upper Dam is in poor condition. The major concerns with respect to the integrity of the dam, if left uncorrected, are:

- (1) Low hydraulic capacity of the spillway which threatens the abutments of the Bissell Covered Bridge immediately downstream of the dam. Sluice gates at both ends of the dam are presently inoperable.
- (2) Cracked stones in the downstream face at the northwesterly end of the dam in the area of the 3.5' by 3' sluiceway.
- (3) Horizontal displacements in the crest of the dam which have caused the ends of the dam to lean forward by as much as 6 inches.
- (4) Small trees and brush growing on the top and downstream face of the dam.

b. Adequacy of Information

The information available is such that the assessment of this dam must be based primarily on the results of the visual inspection.

c. Urgency

The recommendations made in 7.2 and 7.3 should be implemented by the owner immediately after receipt of this Phase I Inspection Report.

7.2 RECOMMENDATIONS

The owner should engage a qualified Registered Professional Engineer to:

- (1) Design procedures to lower the spillway crest in order to reduce the danger of overtopping and potential damage to the abutments of the Bissell Covered Bridge. The crest elevation should be lowered to allow passage of at least the 100 year flood without danger to the bridge abutments. The engineer should inspect the work to insure that the work is properly executed.
- (2) Investigate the movement of the dam and recommend measures to make it structurally stable.
- (3) Investigate the slope failure on the southeasterly abutment below the dam and recommend measures to stabilize it.

- (4) Repair all dislodged and displaced masonry.
- (5) Inspect spillway under no flow.
- (6) Design repairs to sluice gates and operators.

The owner should carry out the recommendations made by the Engineer.

7.3 REMEDIAL MEASURES

a. Operating and Maintenance Procedures

The owner should:

- (1) Cooperate and assist adjacent property owners with clearing overhanging trees between the damsite and the Route 2 bridge. The owner should remove all trees and stumps and debris now present on sediment bars in the reservoir upstream of the dam.
- (2) Have a qualified Registered Professional Engineer perform a technical inspection every year.
- (3) Institute a formal surveillance and warning system.
- (4) Institute a formal operation and maintenance program.

7.4 ALTERNATIVES

Remove the dam in the event that the reservoir is no longer to be used for fire supply, and with due concern for the environmental aspects of removing and disposing of accumulated sediment and for the reservoir's value as a cultural resource.

APPENDIX A

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION PARTY ORGANIZATION
NATIONAL DAM INSPECTION PROGRAM

DAM: J. A. Wells Upper Dam MA 01268

DATE: May 9, 1980

TIME: 1:00 p.m.

WEATHER: 45°F

W.S. ELEV. 643.4 U.S. 622.5 DN.S. - (Water flowing over eroded
portion of spillway only)
ELEV. DATUM: 643 MSL - Spillway crest (interpolated from USGS Quadrangle)

INSPECTION PARTY: (All project features inspected by all party members)

1. J. F. Cysz, P.E.
2. K. N. Hendrickson, P.E.
3. J. E. Walsh, P.E. (Baystate Environmental Consultants, Inc.)
4. L. D. Zwingelstein
5. H. T. Shumway
6.

OTHERS PRESENT DURING INSPECTION:

1.
2.
3.
4.

VISUAL INSPECTION CHECKLIST

DAM: J. A. Wells Upper Dam MA 01268

DATE: May 9, 1980

AREA EVALUATED	CONDITION
<u>DAM</u>	Note: Dam is dry laid stone masonry
Crest Elevation	643 MSL (Interpolated from USGS)
Current Pool Elevation	643.4 MSL
Maximum Impoundment to Date	Est. 2' over dam. 1938 - Partial washout of bridge abutment - bridge later condemned.
Surface Cracks	Visible cracking in face of dam - westerly end above drain sluice. Sluice collapsing. Cracking & erosion of dam @ easterly abutment.
Pavement Condition	No pavement
Movement or Settlement of Crest	Erosion of spillway crest - capstones washed downstream
Lateral Movement	Bulging
Vertical Alignment	Crest vert. align. poor due to erosion & washover of capstones. Easterly abutment tipping forward 6"; also westerly abutment.
Horizontal Alignment	Middle section of dam o.k. Easterly abutment bulging.
Condition of Abutment and at Concrete Structures	No concrete structures - easterly abutment poor. Erosion of masonry and sloughing of slope at easterly abutment. Water from spillway washing behind timber poles. Water line leaking.
Indications of Movement of Structural Items on Slopes	Timber pole retaining wall is bulging at easterly abutment due to failing slope-has exposed & undermined 20" water pipe.
Trespassing on Slopes	Minor - footpaths at easterly abutment.
Vegetation on Slopes	Brush growth on ends of dam.

VISUAL INSPECTION CHECKLIST

DAM: J. A. Wells Upper Dam MA 01268 DATE: May 9, 1980

AREA EVALUATED	CONDITION
<u>DAM</u> (continued)	
Sloughing or Ercsion of Slopes or Abutments	Severe at easterly abutment - sloughing of slope
Rock Slope Protection - Riprap Failures	No riprap. Timber pole retaining wall failing.
Unusual Movement or Cracking at or near Toes	Cracking above sluice drain westerly end. Area near base of dam looks good.
Unusual Embankment or Downstream Seepage	Seepage & spillway overflow causing undermining of 20" water pipe and pole retaining wall at easterly abutment. Leakage through sluice gate at westerly abutment, minor leakage through dam.
Piping or Boils	None detected
Foundation Drainage Features	No foundation drainage
Toe Drains	No toe drains
Instrumentation System	No instrumentation

VISUAL INSPECTION CHECKLIST

DAM: J. A. Wells Upper Dam MA 01268 DATE: May 9, 1980

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u>	Intake for 20" water main
a. Approach Channel	No approach channel. Intake structure located at easterly abutment.
Slope Conditions	Wooded
Bottom Conditions	Heavy silt, debris over intake
Rock Slides or Falls	None
Log Boom	None
Debris	Debris over intake
Condition of Concrete Lining	No concrete - intake structure is wooden, including trash rack.
Drain or Weep Holes	Not applicable
b. Intake Structure	Wooden intake structure & trash rack for 20" water main
Condition of Concrete	No concrete
Stop Logs and Slots	Has slots but no stop logs visible.
	Note: 3.5'x 3' wooden sluice gate pond drainage at westerly end of dam is inoperable, gear rack broken.
	Operating stem for 1½' x 2' sluice gate on easterly abutment not visible. 3/8" steel cable may be for raising gate on 1½' x 2' sluice, original gate operator appears to be missing.

VISUAL INSPECTION CHECKLIST

DAM: J. A. Wells Upper Dam MA 01268 DATE: May 9, 1980

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	
a. Concrete and Structural	No control tower, only outlet control for water pipe is 20" gate valve at easterly abutment. This valve is exposed. A large rock from spillway resting on pipe.
General Condition	
Condition of Joints	
Spalling	Not applicable
Visible Reinforcing	Not applicable
Rusting or Staining of Concrete	Not applicable
Any Seepage or Efflorescence	Not applicable
Joint Alignment	Not applicable
Unusual Seepage or Leaks in Gate Chamber	No gate chamber, gate exposed at easterly abutment.
Cracks	No concrete
Rusting or Corrosion of Steel	No concrete
b. Mechanical and electrical	No electrical
Air Vents	None
Float Wells	None
Crain Hoist	None
Elevator	None
Hydraulic System	None
Service Gates	None
Emergency Gates	See previous sheet which describes sluice gates at westerly and easterly ends of dam.
Lightning Protection System	None

VISUAL INSPECTION CHECKLIST

DAM: J. A. Wells Upper Dam MA 01268

DATE: May 9, 1980

AREA EVALUATED

CONDITION

OUTLET WORKS - CONTROL TOWER (continued)

Emergency Power System None

Wiring and Lighting System None
in Gate Chamber

VISUAL INSPECTION CHECKLIST

DAM: J. A. Wells Upper Dam MA 01268

DATE: May 9, 1980

AREA EVALUATED

CONDITION

OUTLET WORKS - TRANSITION AND CONDUIT

General Condition of Concrete

Not applicable to this structure.
20" C.I. water pipe part of fire
system for Village of Charlemont.

Rust or Staining on Concrete

Spalling

Erosion or Cavitation

Cracking

Alignment of Monoliths

Alignment of Joints

Numbering of Monoliths

VISUAL INSPECTION CHECKLIST

DAM: J. A. Wells Upper Dam MA 01268 DATE: May 9, 1980

AREA EVALUATED

CONDITION

OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL

General Condition of Concrete Not applicable to this structure

Rust or Staining

Spalling

Erosion or Cavitation

Visible Reinforcing

Any Seepage or Efflorescence

Condition at Joints

Drain Holes

Channel

Loose Rock or Trees Overhang-
ing Channel

Condition of Discharge Channel

VISUAL INSPECTION CHECKLIST

DAM: J. A. Wells Upper Dam MA 01268

DATE: May 9, 1980

AREA EVALUATED

CONDITION

OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS

a. Approach Channel

Mill Brook - small pond (1 Ac.+) behind dam.

General Condition

Pond currently silted in almost to top of spillway crest

Loose Rock Overhanging Channel

None

Trees Overhanging Channel

Minor

Floor of Approach Channel

Pond silted in

b. Weir and Training Walls

General Condition of Concrete

Main body of dam serves as weir (see description under Dam, Sht. A-2) Dam & training walls are stone masonry. Training wall at easterly abutment is laid up w/mortar-dam appears to be dry laid. Training wall at easterly abutment probably constructed later than dam.

Rust or Staining

Not applicable

Spalling

Not applicable

Any Visible Reinforcing

Not applicable

Any Seepage or Efflorescence

Seepage and minor leakage thru face of dam.

Drain Holes

No drain holes

c. Discharge Channel

General Condition

Spillway discharges into rock gorge beneath covered bridge.

Loose Rock Overhanging Channel

Minor - few loose pieces of rock 2 C.Y. Exposed bedrock on channel generally sound.

VISUAL INSPECTION CHECKLIST

DAM: J. A. Wells Upper Dam MA 01268

DATE: May 9, 1980

AREA EVALUATED

CONDITION

OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS (continued)

Trees Overhanging Channel

Yes, downstream of covered bridge

Floor of Channel

Natural - ledge

Other Obstructions

Yes, needs maintenance between covered bridge and Route 2. Old mill building (now a residence) has foundation at edge of stream.

VISUAL INSPECTION CHECKLIST

DAM: J. A. Wells Upper Dam MA 01268

DATE: May 9, 1980

AREA EVALUATED

CONDITION

OUTLET WORKS - SERVICE BRIDGE

No service bridge. Gate operators accessible from abutments.

a. Super Structure

Bearings

Anchor Bolts

Bridge Seat

Longitudinal Members

Under Side of Deck

Secondary Bracing

Deck

Drainage System

Railings

Expansion Joints

Paint

b. Abutment & Piers

General Condition of Concrete

Alignment of Abutment

Approach to Bridge

Condition of Seat & Backwall

APPENDIX B

ENGINEERING DATA

- B-1. LIST OF AVAILABLE DESIGN, CONSTRUCTION
AND MAINTENANCE RECORDS
- B-2. PREVIOUS INSPECTION REPORTS
- B-3. PLANS, SECTIONS AND PROFILES
- B-4. TYPICAL BORING LOGS

LIST OF AVAILABLE DESIGN
CONSTRUCTION AND MAINTENANCE RECORDS

- A. PLANS - None found
- B. SPECIFICATIONS - None found
- C. DESIGN RECORDS - None found
- D. CONSTRUCTION RECORDS - None found
- E. MAINTENANCE - Recent Maintenance Records are
available from the Charlemont
Fire District, Charlemont, MA.

SELECTED PREVIOUS INSPECTION REPORTS

APPENDIX B-2

A. SKETCHES COMPILED DURING PHASE I INSPECTION SHOWING
GENERAL LAYOUT OF DAM, TYPICAL SECTIONS AND DETAILS
OF SIGNIFICANT FEATURES.

Figure 1. General Plan of Damsite

Figure 2. Plan View of Mill Brook showing Section C-C
2000' Downstream of Damsite

Figure 3. Typical Sections

B. RECORD PLANS - None found.



The Commonwealth of Massachusetts

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL QUALITY ENGR.
DIVISION OF WATERWAYS

100 Nashua Street, Boston 02114

January 18, 1978

Charlemont Fire District
Board of Trustees
Charlemont, Mass.

RE: Insp. Dam #2-6-53-1
J.A. Wells Upper Dam
Charlemont

Gentlemen:

On June 8, 1977, an Engineer from the Massachusetts Department of Public Works made a visual inspection of the above dam. Our records indicate the owner to be Charlemont Fire District. If this information is incorrect will you please notify this office.

The inspection was made in accordance with the provisions of Chapter 253 of the Massachusetts General Laws as amended (Dams Safety Act). Chapter 706 of the Acts of 1975 transferred the jurisdiction of the so-called "Dams Safety Program" to the Commissioner of the Department of Environmental Quality Engineering.

The results of the inspection indicate that this dam is safe; however, the following conditions were noted that require attention:

Brush growth on ends of dam should be removed. Capstones on spillway need replacing. Several small stones in face of downstream dropwall need replacing. Seepage flows were noted in drawdown sluices-this should be corrected. Several leaks through stone masonry joints-this should be corrected.

We call these conditions to your attention before they become serious and more expensive to correct. With any correspondence please include the number of the Dam as indicated above.

Very truly yours,

John J. Hannon, P.E.
Chief Engineer

Attest:

cc: Charlemont Fire Dept. Chief
Board of Selectmen
F.J. Hoey, DRE
H. Shunday, Dist. #2

INSPECTION REPORT - DAMS AND RESERVOIRS

1. LOCATION:

City/Town Charlemont County Franklin Dam No. 11-5-75-1

Name of Dam J. J. Wells Open Dam

Mass. Reet,
Topo Sheet No. 7B Coordinates: N 597,500 , E 241,600

Inspected by: Harold W. Shumway , On June 8, 1977 . Date
Last Inspection 11-5-75 .

2. OWNER/S: As of June 8, 1977

per: Assessors _____, Reg. of Deeds _____, Frev. Insp. Y , Per. Contact X .

Board of Trustees,
Charlemont Fire District, Charlemont, Mass.

Name	St. & No.	City/Town	State	Tel. No.
Trustees are:				
1. Mr. Frank J. Wells				
Name	St. & No.	City/Town	State	Tel. No.
Henry Avery, Jr.				
3. Kenneth W. Henderson				
Name	St. & No.	City/Town	State	Tel. No.

3. CARETAKER: (if any) e.g. superintendent, plant manager, appointed by absentee owner, appointed by multi owners. Charlemont Fire Dept., c/o Chief C.F.D., Charlemont, Mass.

Name	St. & No.	City/Town	State	Tel. No.
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4. DATA: 2 by _____ No. of Pictures Taken 0.C.D. . Sketches See description of Dam. Plans, Where None located

5. DEGREE OF HAZARD: (if dam should fail completely)*

1. Minor _____	3. Severe _____
2. Moderate <u>2</u> _____	4. Disastrous _____

Comments: 1 million gallons plus impoundment - would destroy hydrant system main -
possibly undermine one residential building.

*This rating may change as land use changes (future development).

6. OUTLETS: OUTLET CONTROLS AND DRAWDOWN

No. 1 Location and Type: Spillway on left - 24' x 14' with stone masonry
droped 11' high maximum.

Controls gate, TYPE: wood slide gate with rack and pinion gear controls.

Automatic . Manual . Operative Yes , No .

Comments: Large cavity in lip of spillway

No. 2 Location and Type: Westerly end of dam - 3' x 3' stone masonry box sluice

Controls Yes, Type: Wood slide gate with rack and pinion gear controls.

Automatic . Manual X. Operative Yes X, No .

Comments: Gate partially silted over

No. 3 Location and Type: Easterly end of dam - stone box mud sluice 1 1/2' W. x 2' H.

Controls Yes, Type: Wood slide gate - 2" x 6" x 12' long stem

Automatic . Manual X. Operative Yes , No .

Comments: This gate can only be operated after water level in pond is lowered
by opening gate listed in item #2 above.

Drawdown present Yes X, No . Operative Yes X, No .

Comments: See items #2 and #3 above - there is also a C.I. 20" diam. water main
and gate valve which would partially drain pond.

7. DAM UPSTREAM FACE: Slope Vertical, Depth Water at Dam 5' to 12'

Material: Turf . Brush & Trees . Rock fill . dry stone
masonry X. Wood .

Other

Condition: 1. Good . 3. Major Repairs .

2. Minor Repairs X. 4. Urgent Repairs .

Comments: See item #3 comments.

8. DAM DOWNSTREAM FACE: Slope Vertical

Material: Turf . Brush & Trees . Rock Fill . dry stone
masonry X. Wood .

Other

Condition: 1. Good . 3. Major Repairs X.

2. Minor Repairs . 4. Urgent Repairs .

Comments: Spillway crest lip unraveling - several leaks through stone masonry joints

9. EMERGENCY SPILLWAY: Available Yes. Needed .

Height Above Normal Water Ft.

Width Ft. Height Ft. Material .

Condition: 1. Good . 3. Major Repairs .

2. Minor Repairs . 4. Urgent Repairs .

Comments: entire top of dam would serve as overflow spillway in high water runoffs.

10. WATER LEVEL AT TIME OF INSPECTION: 1/4 Ft. Above X. Below .

Top Dam F.L. Principal Spillway X.

Other .

Normal Freeboard 4 1/2 Ft.

11. SUMMARY OF DEFICIENCIES NOTED:

Growth (Trees and Brush) on Embankment Minor brush growth on ends of dam.

Animal Burrows and Washouts None found.

Damage to Slopes or Top of Dam Lip of spillway breaking away.

Cracked or Damaged Masonry Cavity in easterly spillway abutment. Many misplaced stones in face of dropwall.

Evidence of Seepage Seepage flows noted in sluiceways.

Evidence of Piping None found.

Leaks Several leaks through stone masonry joints.

Erosion None found.

Trash and/or Debris Impeding Flow None found.

Clogged or Blocked Spillway None found.

Other .

(12.)

OVERALL CONDITION:

1. Safe _____.
2. Minor repairs needed _____.
3. Conditionally safe - major repairs needed _____.
4. Unsafe _____.
5. Reservoir impoundment no longer exists (explain)
Recommend removal from inspection list _____.

(13.)

REMARKS AND RECOMMENDATIONS: (Fully Explain)

The general overall condition of this dam appears to have deteriorated since last inspection. Spillway crest capstones have broken off to the extent that in some areas only 50% of original capstones remain in place. The stone masonry abutment on easterly end of dam has a cavity from misplaced stones near crest of spillway. Several small stones in face of dropwall on downstream side have become misplaced. Seepage flows were noted in drawdown sluices. While none of these items appear to create a serious hazard to safety of dam at present time they indicate a deteriorating condition which could progress to a point where the safety of dam would be endangered.

The District suggests that copies of any correspondence pertaining to this dam be sent to the Charlemont Fire Dept. Chief and the Charlemont Board of Selectmen as well as to the Charlemont Fire District Trustees.

HJL/jjs

Cond. #2

District #2 Office
North King Street, Northampton 01060

November 25, 1975

SUBJECT: Dam - Charlemont
J. A. Wells Upper Dam
Dam No. 2-6-53-1

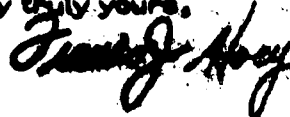
Mr. Robert T. Tierney, P.E.
Chief Engineer
Mass. Dept. of Public Works
100 Nashua Street
Boston, Massachusetts 02114

Attention: Mr. John J. Hannon
Chief Engineer of Waterways Division

Dear Sir:

Enclosed is a Dam Reinspection Report for the J. A. Wells Upper
Dam No. 2-6-53-1 in Charlemont.

Very truly yours,



FRANCIS J. HOEY, P.E.
District Highway Engineer

HTS/bk
C-HEB✓

INSPECTION REPORT - DAMS AND RESERVOIRS

1. LOCATION:

City/Town Charlemont County Franklin Dam No. 2-6-53-1

Name of Dam J. A. Wells Upper Dam

Mass. Rect.

Topo Sheet No. 7 B Coordinates: N 597,500 , E 231,600

Date

Inspected by: Harold T. Shumway , On Nov. 5, 1975 . Last Inspection 8-13-73 .

2. OWNER/S:

As of November 5, 1975

per: Assessors _____, Reg. of Deeds _____, Prev. Insp. X , Per. Contact _____.

1. Charlemont Fire District Charlemont, Mass.
Name _____ St. & No. _____ City/Town _____ State _____ Tel. No. _____

District Trustees are:

2. Frank J. Wells
Name _____ St. & No. _____ City/Town _____ State _____ Tel. No. _____

Henry Avery, Jr.

3. D. Ambrose Lanoue, Jr. Charlemont, Mass.
Name _____ St. & No. _____ City/Town _____ State _____ Tel. No. _____

3. CARETAKER:

(if any) e.g. superintendent, plant manager, appointed by
absentee owner, appointed by multi owners.

Charl. Fire Dept.

%Chief C.F.D. Charlemont, Mass.

Name _____ St. & No. _____ City/Town _____ State _____ Tel. No. _____

4. DATA:

2 by

No. of Pictures Taken S.C.S. Sketches See description of Dam.

Plans, Where none located

5. DEGREE OF HAZARD: (if dam should fail completely)*

1. Minor _____.

3. Severe _____.

2. Moderate X _____.

4. Disastrous _____.

Comments: could wash out hydrant system main - possibly undermine one residential building.

*This rating may change as land use changes (future development).

⑥

OUTLETS: OUTLET CONTROLS AND DRAWDOWN

crest overflow spillway - 44' W.x 4.5'H. with stone masonry

No. 1 Location and Type: drawdown 18' H. maximum.

Controls none, TYPE: _____.

Automatic _____, Manual _____, Operative Yes _____, No _____.

Comments: top of spillway uncavelling badly.

No. 2 Location and Type: westerly end of dam - stone sluice box - 3'W.x 3'H.

Controls yes, Type: wood slide gate with rack and pinion gear controls.

Automatic _____, Manual X, Operative Yes X, No _____.

Comments: Gate partially silted in.

No. 3 Location and Type: easterly end of dam - stone box mud sluice - 1 1/2'W.x 2'H

Controls yes, Type: wood slide gate - 2" x 6" x 12' stem.

Automatic _____, Manual X, Operative Yes _____, No _____.

Comments: This gate can only be operated after water level is lowered by opening gate listed in item #2 above.

Drawdown present Yes X, No _____, Operative Yes X, No _____.

Comments: see items #2 and #3 above - there is also a C.I. 20" dia. water main and gate valve which is operable and would partially drain pond.

⑦

DAM UPSTREAM FACE: Slope vertical, Depth Water at Dam 5' to 12'

Material: Turf _____, Brush & Trees _____, Rock fill _____, ^{dry stone} Masonry X, Wood _____.

Other _____.

Condition: 1. Good X, 3. Major Repairs _____.

2. Minor Repairs _____, 4. Urgent Repairs _____.

Comments: Mud sluice gate replaced this past spring. Upstream face appears sound.

⑧

DAM DOWNSTREAM FACE: Slope vertical.

Material: Turf _____, Brush & Trees _____, Rock Fill _____, ^{Dry stone} Masonry X, Wood _____.

Other _____.

Condition: 1. Good _____, 3. Major Repairs _____.

2. Minor Repairs X, 4. Urgent Repairs _____.

Comments: One bush clump growing out of crevice in stone masonry on westerly end of dam wall.

9. EMERGENCY SPILLWAY: Available yes. Needed _____.

Height Above Normal Water: _____ Ft.

Width _____ Ft. Height _____ Ft. Material _____.

Condition: 1. Good _____.

3. Major Repairs _____.

2. Minor Repairs _____.

4. Urgent Repairs _____.

Comments: Entire top of dam would serve as overflow spillway in high water
run offs.

10. WATER LEVEL AT TIME OF INSPECTION: 1/3 Ft. Above X. Below _____.

Top Dam _____ F.L. Principal Spillway X.

Other _____.

Normal Freeboard 4 1/2 Ft.

11. SUMMARY OF DEFICIENCIES NOTED:

Growth (Trees and Brush) on Embankment none found

Animal Burrows and Washouts none found

Damage to Slopes or Top of Dam top of spillway breaking away.

Cracked or Damaged Masonry Grade of top of dam masonry walls irregular. Some misplaced stones.

Evidence of Seepage yes - seepage noted at outlet end of sluiceways.

Evidence of Piping none found - heavy overflow of water at time of inspection.

Leaks none found - inspection made checking for leaks difficult.

Erosion none found

Trash and/or Debris Impeding Flow none found

Clogged or Blocked Spillway none found

Other _____

(13.)

OVERALL CONDITION:

1. Safe _____.
2. Minor repairs needed X
3. Conditionally safe - major repairs needed _____
4. Unsafe _____.
5. Reservoir impoundment no longer exists (explain)
Recommend removal from inspection list _____

(13.)

REMARKS AND RECOMMENDATIONS: (Fully Explain)

Considerable repair work has been accomplished since last inspection on August 13, 1973. The westerly draw down sluice gate and controls have all been renewed and are in operating condition. The cave-in of wall westerly of sluice has been effectively repaired. The brush and tree growth has been removed. There is one clump of brush still growing out of a crevice in stone masonry on downstream face of westerly abutment. This appears to be a new growth from original stump which should be removed to prevent root damage to stone masonry.

A large portion of the silt in pond observed two years ago has been removed. Water depth at dam is now 5' to 12' which has increased impoundment capacity to approx. 1 1/2 million gallons.

There are still some misplaced stones along top of wall on easterly end of dam but this does not appear to create any hazard to safety of dam.

There is some breakage of spillway cap stones occurring on lip of spillway but this unravelling is minor as yet.

Heavy overflow of water at time of inspection made a close check of dropwall impossible but from what could be observed it appears sound. Some minor seepage was noted in both sluiceways, due probably to a poor seal on gates.

This dam appears safe at present time with only minor maintenance repairs needed.

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

September 6, 1973

Charlmont Fire District
Board of Trustees
Charlmont, Massachusetts

RE: Inspection-Dam/2-6-53-1
Charlmont
J. A. Wells Upper Dam

Gentlemen:

An engineer from the Massachusetts Department of Public Works has inspected the above dam, of which the Charlmont Fire District is the owner.

The inspection was made in accordance with Chapter 253 of the Massachusetts General Laws, as amended by Chapter 595 of the Acts of 1970.

The results of the inspection indicate that this dam is unsafe. You are hereby directed to drawdown the reservoir to a safe level until the repairs have been completed. The following conditions were noted that require attention:

1. Repair or replace the inoperative gates.
2. Repair the stone wall at the downstream face westerly of the sluiceway. Stones have fallen away leaving a hole 3ft. high by 4ft. long and 2 to 3 ft. deep.
3. Remove the growth of brush and trees from the top of the end walls and along the downstream face of the dam.
4. The reservoir has silted in. Serious consideration should be given to the removal of these deposits once the dam is made safe.
5. The alignment of the dam could be improved at the spillway end walls and especially the slight bulge along the downstream face.

Dam #2-6-53-1

September 6, 1973

. As the trustees of this dam there is another course of action available to you, that is to completely drawdown the reservoir and then creating a wide breach to restore the normal flow of the break. In the event that restoration is your course of action then it is strongly recommended that you obtain the services of a Registered Professional Civil Engineer experienced in the design and maintenance of dams.

An early reply indicating your intention is necessary. If we may be of assistance please do not hesitate to contact us. Your questions may be directed to Mr. Leo Andronico or Mr. John Piaseczny, telephone 727-4793.

Very truly yours,

MALCOLM E. GRAF
Associate Commissioner

Handwritten initials
LRA/af

cc: F. J. Hoey DHE#2'
R. Salls Dist#2'

DESCRIPTION OF DAM

DISTRICT 2.

Submitted by H. T. SHUEWAY Dam No. 2-6-53-1
Date August 13, 1973 City/Town Charlottesville
Name of Dam J.A. Wells Upper Dam

1. Location: Topo Sheet No. 7E Mass. Rect. Coordinates N 597,500 E 231,600

Provide 8 1/2" x 11" in clear copy of topo map with location of Dam clearly indicated.

On Mill Brook just north of "Bissell Bridge" on North Heath Road "Route 8A",
about 1500' north of Lohawk Trail - Route 2.

2. Year built Unknown Year/s of subsequent repairs 1964
Existed in 1924

3. Purpose of Dam: Water Supply x Recreational _____
Flood Control _____ Irrigation _____ Other Formerly used for power
for grain mills in Charlottesville
Is now water supply for fire hydrant system in Charlottesville. Center

4. Drainage Area: 10+ sq. mi. _____ acres.
Type: City, Bus. & Ind. _____ Dense Res. _____ Suburban _____ Rural, Farm 85%
Wood & Scrub Land 85% Slope: Steep 75% Med. 15% Slight 10%

5. Normal Ponding Area: 6/10 Acres; Ave. Depth 5 feet
Impoundment: 9/10 million gals.; 3 acre ft.
Silted in: Yes x No _____ Approx. Amount Storage Area 60%
Impoundment would increase greatly if silt were cleaned out.

6. No. and type of dwellings located adjacent to pond or reservoir 2
i.e. summer homes etc. Year round residents.

7. Dimensions of Dam: Length 102' total Max. Height 18'
Freeboard 4.5'
Slopes: Upstream Face vertical
Downstream Face vertical drop wall
Width across top 10' east end - 9' west end.

Dam No. 2-6-53-1

8.

Classification of Dam by Material:

Earth _____ Conc. Masonry _____ Stone Masonry Dry _____

Timber _____ Rockfill _____ Other _____

Rock ledge foundation

8a.

Dam Type: Gravity _____ Straight X Curved, Arched _____ Other Wall Dam
Overflow X Non-overflow _____

9.

A. Description of present land usage downstream of dam:

60 % rural; 40 % ~~urban~~ developed

B. Is there a storage area or flood plain downstream of dam which could accommodate the impoundment in the event of a complete dam failure? Yes _____ No X

C. Character Downstream Valley: Narrow 60% Wide 40% Developed 40%
Rural 60% Urban _____

10.

Risk to life and property in event of complete failure.

No. of people 1

No. of homes 1

No. of businesses None

No. of industries None Type _____

No. of utilities 1 Type Water hydrant system

Railroads None

Other dams None

Other _____

11.

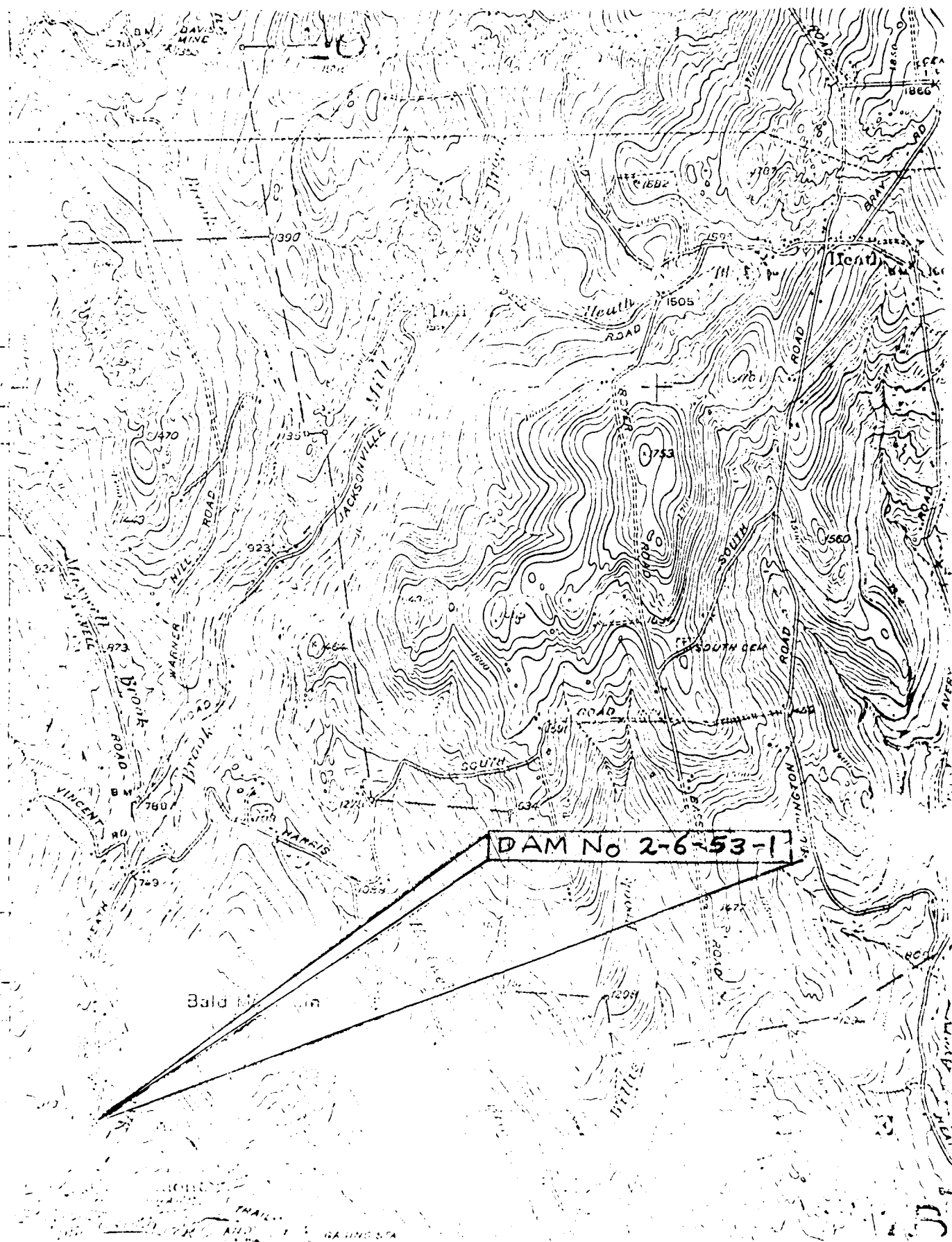
Attach Sketch of dam to this form showing section and plan on 8¹/₂" x 11" sheet.

RCS/v/rt

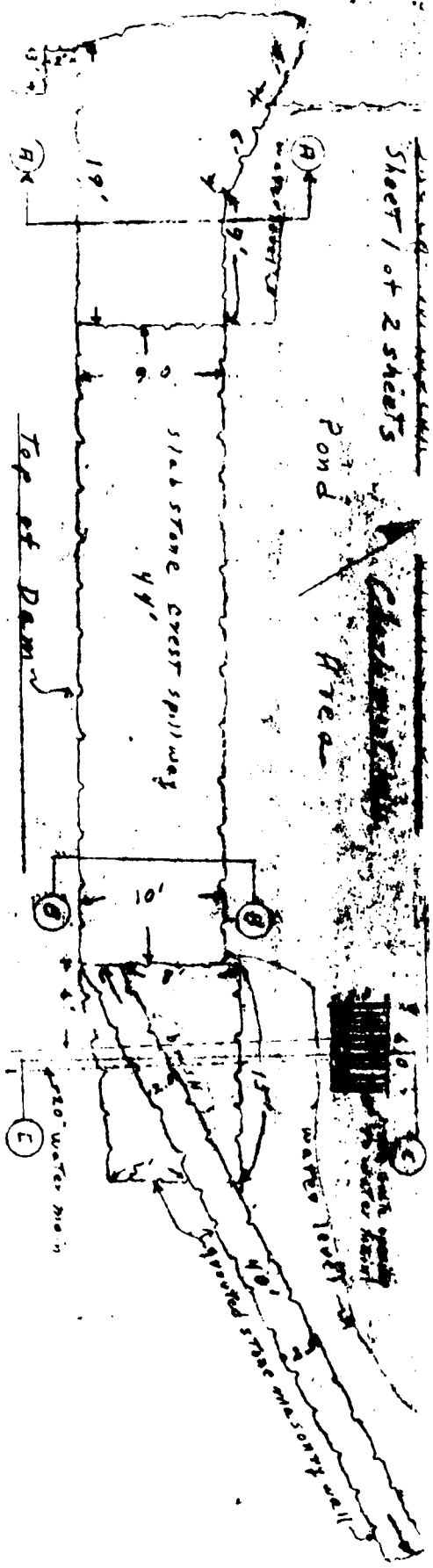
Attachments

Locus Plan

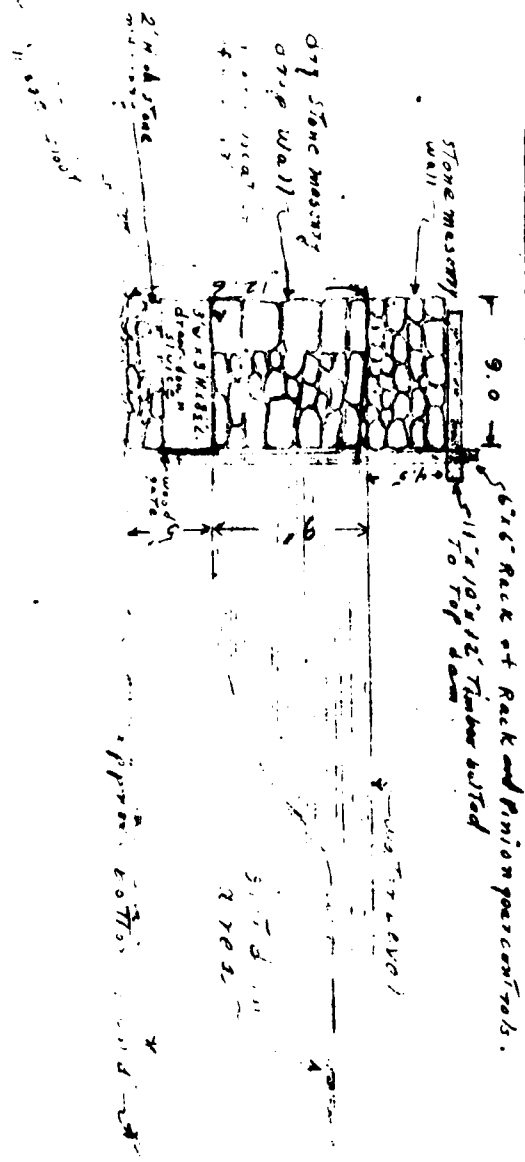
Sketches



Sheet 1 of 2 sheets



Sketch - X-Section A-A Not To Scale



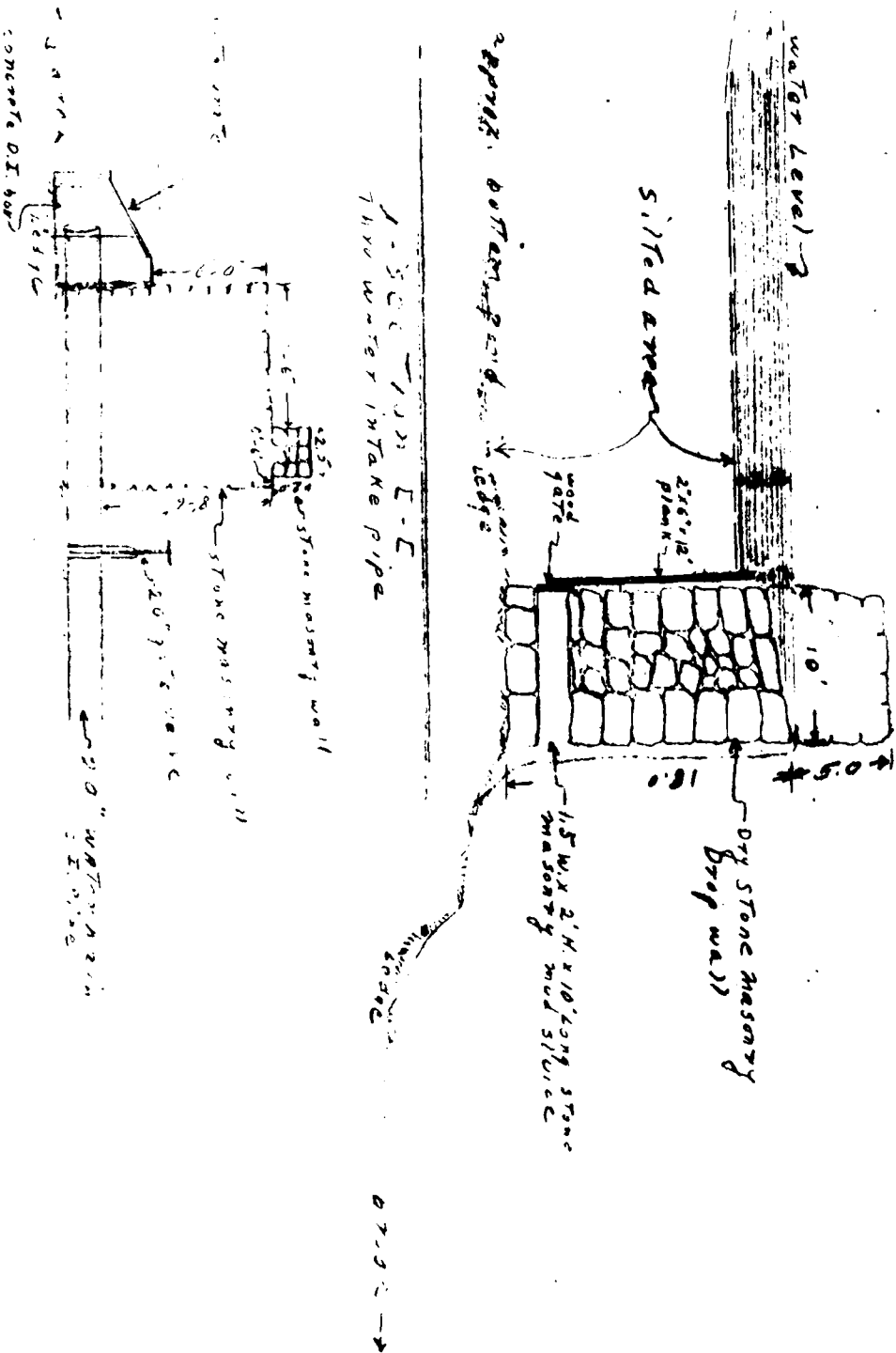
SKETCHES AT 1/4" SCALE

SHEET 2 of 2 SHEETS

I.B. Wells
Sketch with notes

Page No. 2-6-53-1

Y-SECTION B-B



INSPECTION REPORT - DAMS AND RESERVOIRS

1. LOCATION:

City/Town Charlton County Franklin Dam No. 2-6-53-1Name of Dam J.A. Wells Upper Dam

Mass. Rect.

Topo Sheet No. 78 Coordinates: N 597.500, E 231.600Inspected by: H.T. Shumway, On Aug. 13, 1973 Date 1970 Last Inspection

2.

OWNER/S: As of December 2, 1963per: Assessors _____, Reg. of Deeds X, Prev. Insp. _____, Per. Contact _____

1. <u>Charlton Fire District</u>	<u>Charlton, Mass.</u>
Name _____	City/Town _____ State _____ Tel. No. _____
Trustees of District)	
2. <u>Frank J. Wells</u>	
Name _____	City/Town _____ State _____ Tel. No. _____
Henry Avery, Jr.	
3. <u>D. Ambrose Lanoue, Jr.</u>	<u>Charlton, Mass.</u>
Name _____	City/Town _____ State _____ Tel. No. _____

3.

CARETAKER: (if any) e.g. superintendent, plant manager, appointed by absentee owner, appointed by multi owners.

Trustees named above #2 question

Name _____	St. & No. _____	City/Town _____	State _____	Tel. No. _____
------------	-----------------	-----------------	-------------	----------------

4.

DATA:

No. of Pictures Taken 2 by S.C.S. Sketches See description of Dam.
Plans, Where None

5.

DEGREE OF HAZARD: (if dam should fail completely)*

1. Minor _____ 3. Severe _____

2. Moderate X 4. Disastrous _____Comments: Would wash out hydrant system feed line. Possibly undermine foundation of the building.

*This rating may change as land use changes (future development).

6.

OUTLETS: OUTLET CONTROLS AND DRAWDOWN

No. 1 Location and Type: Overflow dropwall spillway 44' W x 4.5' H drop 18'
max. to ledge.Controls one, TYPE: _____.

Automatic _____, Manual _____, Operative Yes _____, No _____.

Comments: rest overflow drop wall spillway.No. 2 Location and Type: West end of dam 3'W x 3'H x 8 1/2'L stone sluicewayControls X, Type: Rack and pinion with sliding wooden gate.Automatic _____, Manual X, Operative Yes _____, No X.Comments: Gate are warped. Gear box broken.No. 3 Location and Type: Easterly end of dam - stone box sluiceControls X, Type: Sliding wood gate valve.Automatic _____, Manual X, Operative Yes _____, No X.Comments: This gate cannot be opened until gate on west end is opened and water is drawn down to level of gate on easterly end.Drawdown present Yes X, No _____, Operative Yes _____, No X.Comments: See questions #2 and #3 above.

7.

DAM UPSTREAM FACE: Slope Vertical, Depth Water at Dam 3.5' to 9' -
See SketchesMaterial: Turf _____, Brush & Trees _____, Rock fill _____, Masonry X, Wood _____.

Other _____.

Condition: 1. Good _____, 3. Major Repairs _____.

2. Minor Repairs X, 4. Urgent Repairs _____.Comments: Pond badly silted in - covers both sluiceway gates.Some stones out of place.

8.

DAM DOWNSTREAM FACE: Slope Vertical.Material: Turf _____, Brush & Trees _____, Rock Fill _____, Masonry X, Wood _____.

Other _____.

Condition: 1. Good _____, 3. Major Repairs _____.

2. Minor Repairs _____, 4. Urgent Repairs X.Comments: bad hole on west side of westerly draw down sluiceway. Hole is 4' long by 3' wide - stones fallen out of dam wall.

OUTLETS: OUTLET CONTROLS AND DRAWDOWN

No. 4 Location and Type: Through waterway abutment: 20" water main intake.

Controls Yes, TYPE: 20" gate valve just downstream of dam.

Automatic . Manual X . Operative Yes , No . Unk.

Comments: Intake structure is concrete box with metal grate - 4' x 6'

No. 2 Location and Type:

Controls _____, Type: _____.

Automatic . Manual . Operative Yes , No .

Comments:

No. 3 Location and Type: _____

Controls , Type: _____

Automatic . Manual . Operative Yes , No .

Comments:

Drawdown present Yes , No . Operative Yes , No .

Comments: _____

7. DAM UPSTREAM FACE: Slope _____, Depth Water at Dam _____.

Material: Turf . Brush & Trees . Rock fill . Masonry . Wood .

Other _____

Condition: 1. Good_____. 3. Major Repairs_____.

2. Minor Repairs . 4. Urgent Repairs .

Comments: _____

8. DAM DOWNSTREAM FACTS: slope

Material: Turf . Brush & Trees . Rock Fill . Masonry . Wood_____

Other

Condition: 1. Good . 3. Major Repairs_____.

2. Minor Repairs . 4. Urgent Repairs .

Comments: _____

9. EMERGENCY SPILLWAY: Available None. Needed _____.

Height Above Normal Water _____ Ft.

Width _____ Ft. Height _____ Ft. Material _____.

Condition: 1. Good _____. 3. Major Repairs _____.

2. Minor Repairs _____. 4. Urgent Repairs _____.

Comments: Entire top of dam is emergency spillway in flood conditions.

10. WATER LEVEL AT TIME OF INSPECTION: 1/6 Ft. Above X. Below _____.

Top Dam _____ F.L. Principal Spillway X.

Other 2" overflow at crest of dam.

Normal Freeboard 4.5 Ft.

11. SUMMARY OF DEFICIENCIES NOTED:

Growth (Trees and Brush) on Embankment Brush and small trees at both ends of dam.

Animal Burrows and Washouts None found.

Damage to Slopes or Top of Dam Some stones missing on top of dam.

Cracked or Damaged Masonry Bad fallout on downstream end of west sluiceway.

Evidence of Seepage General seepage.

Evidence of Piping Small stream of water going by side of west draw down gate.

Leaks Small leaks in top two feet of dam wall.

Erosion Uneven surface on top of spillway - missing stones.

Trash and/or Debris Impeding Flow None found.

Clogged or Blocked Spillway None found.

Other Draw down sluiceways silted over.

(12.)

OVERALL CONDITION:

1. Safe _____.
2. Minor repairs needed _____.
3. Conditionally safe - major repairs needed _____.
4. Unsafe X _____.
5. Reservoir impoundment no longer exists (explain)
Recommend removal from inspection list _____.

(13.)

REMARKS AND RECOMMENDATIONS: (Fully Explain)

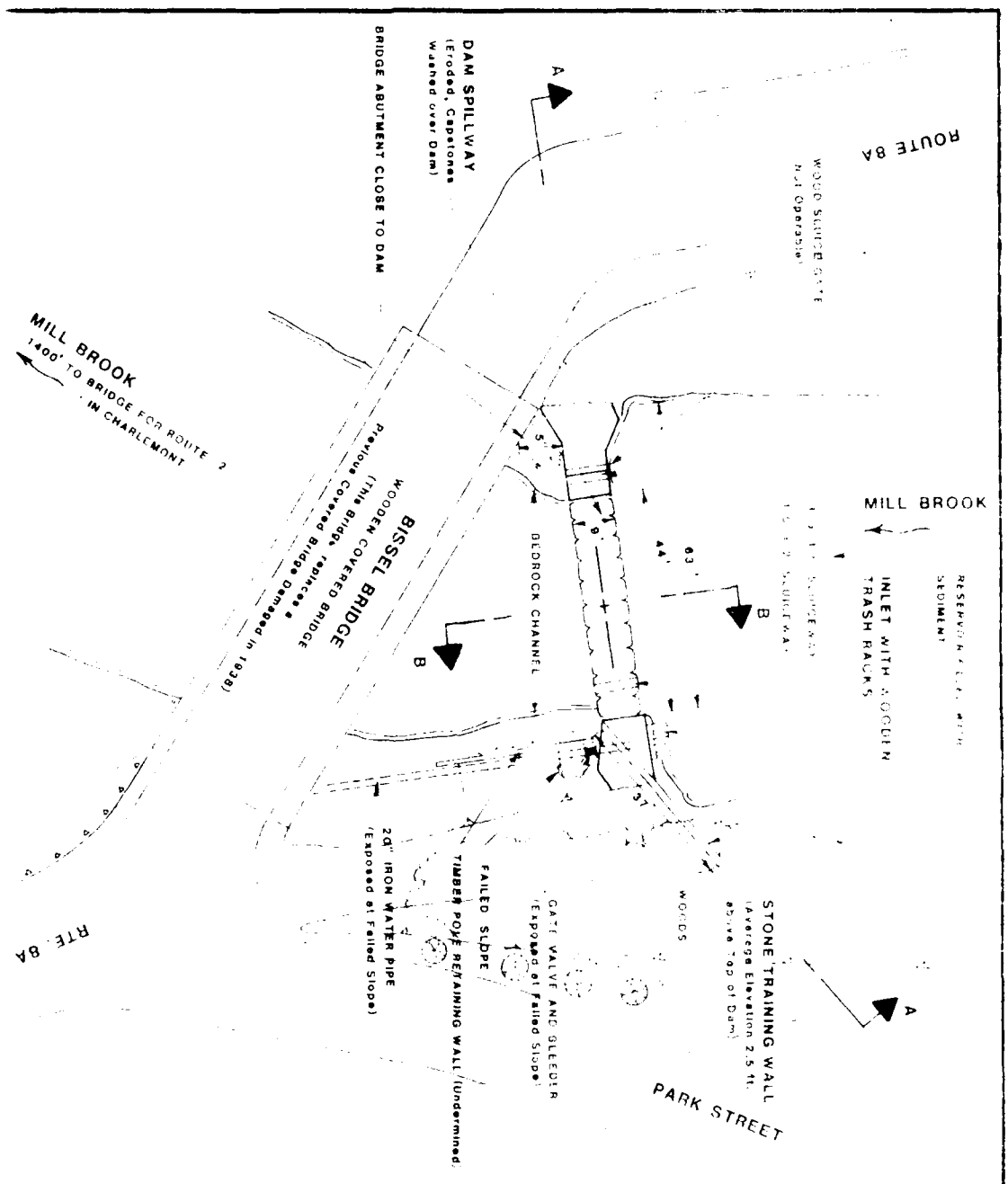
This dam has had very little upkeep in last nine or more years. Dam was drawn down and new gates installed and silt removed by Charlemont Fire District shortly after purchase of site. Apparently no maintenance has been done since then. Dam is again badly silted in. Gate valves are inoperable due to warping of timbers and broken controls on west end of dam.

This draw down should be repaired and kept in operating condition. Stones have fallen out of downstream face of dam on westerly side of draw down sluiceway leaving a hole in face of dam 3' high and 4' long, and about 2' to 3' in depth into wall of dam. There is considerable brush and small trees one to two inches in diameter growing on top of end walls of dam and on downstream face of dam that should be removed.

Alignment and grade of dam wall could be improved. Grade of spillway and end walls especially slight bulge in downstream face.

Due to silting of pondage area there is not a serious threat to dam wall at present time. However, if silt were to be removed to an overall depth of nine or ten feet of water in pond, repairs should be made to dam wall before it was refilled.

Siltage consists of layers of leaves, clay, gravel and general debris.



NOTE: Elevation Datum is Based on Elevation of Mill Brook as Shown on USGS Health, Mass Quadrangle

GENERAL PLAN

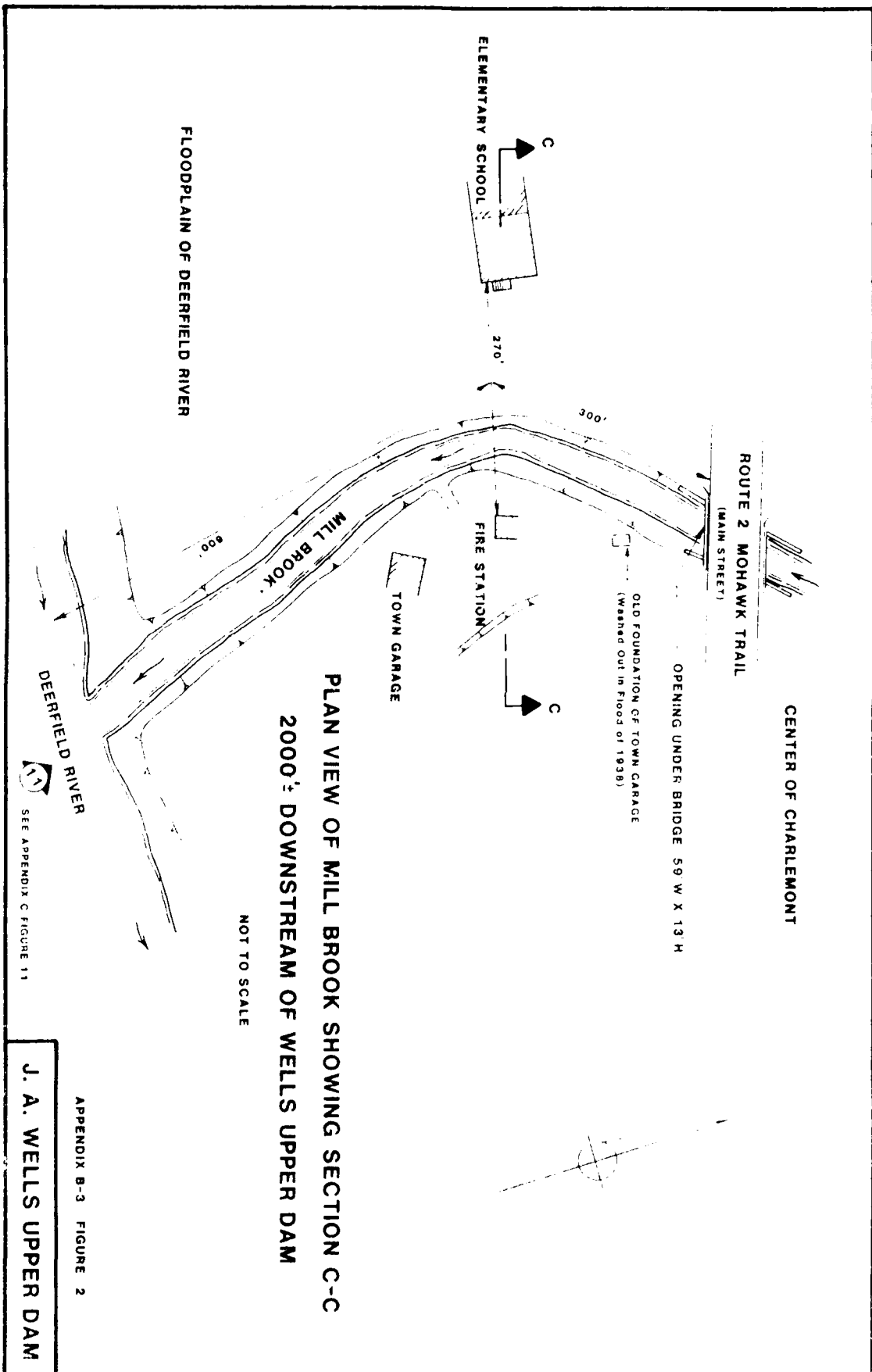
APPENDIX B-3 FIGURE 1

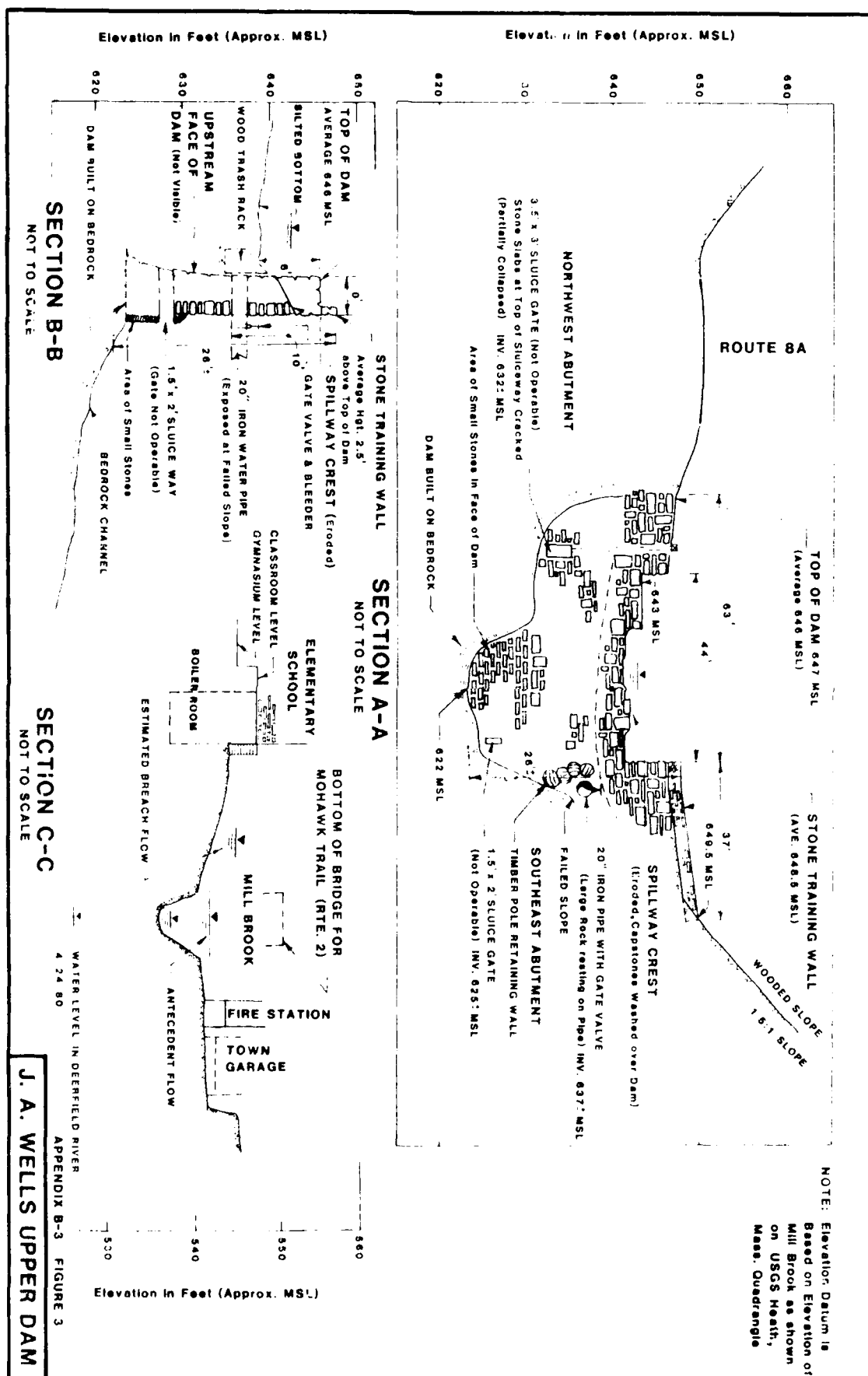
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS

ROBERT G. BROWN & ASSOCIATES, INC.
Pittsfield, Massachusetts

NATIONAL PROGRAM FOR
INSPECTION OF NON-FEDERAL DAMS
J. A. WELLS UPPER DAM

MA 01268
WILL BROOK
MASSACHUSETTS
CHARLEMONT
STAFF NO. 70-574-1 PART 1 OF 10





TYPICAL BORING LOGS

A. None available

APPENDIX B-4

APPENDIX C

PHOTOGRAPHS

C-1. PHOTOGRAPH INDEXES

Figure 1 - Damsite

Figure 2 - Downstream

C-2. SELECTED PHOTOGRAPHS

NOTE: Elevation Datum is Based on Elevation of Mill Brook as Shown on USGS Heath, Mass. Quadrangle

PHOTOGRAPH INDEX APPENDIX C-1 FIGURE 1

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS

ROBERT G. BROWN & ASSOCIATES, INC.
Pittsfield, Massachusetts

NATIONAL PROGRAM FOR
INSPECTION OF NON-FEDERAL DAMS
J. A. WELLS UPPER DAM

MA 01268

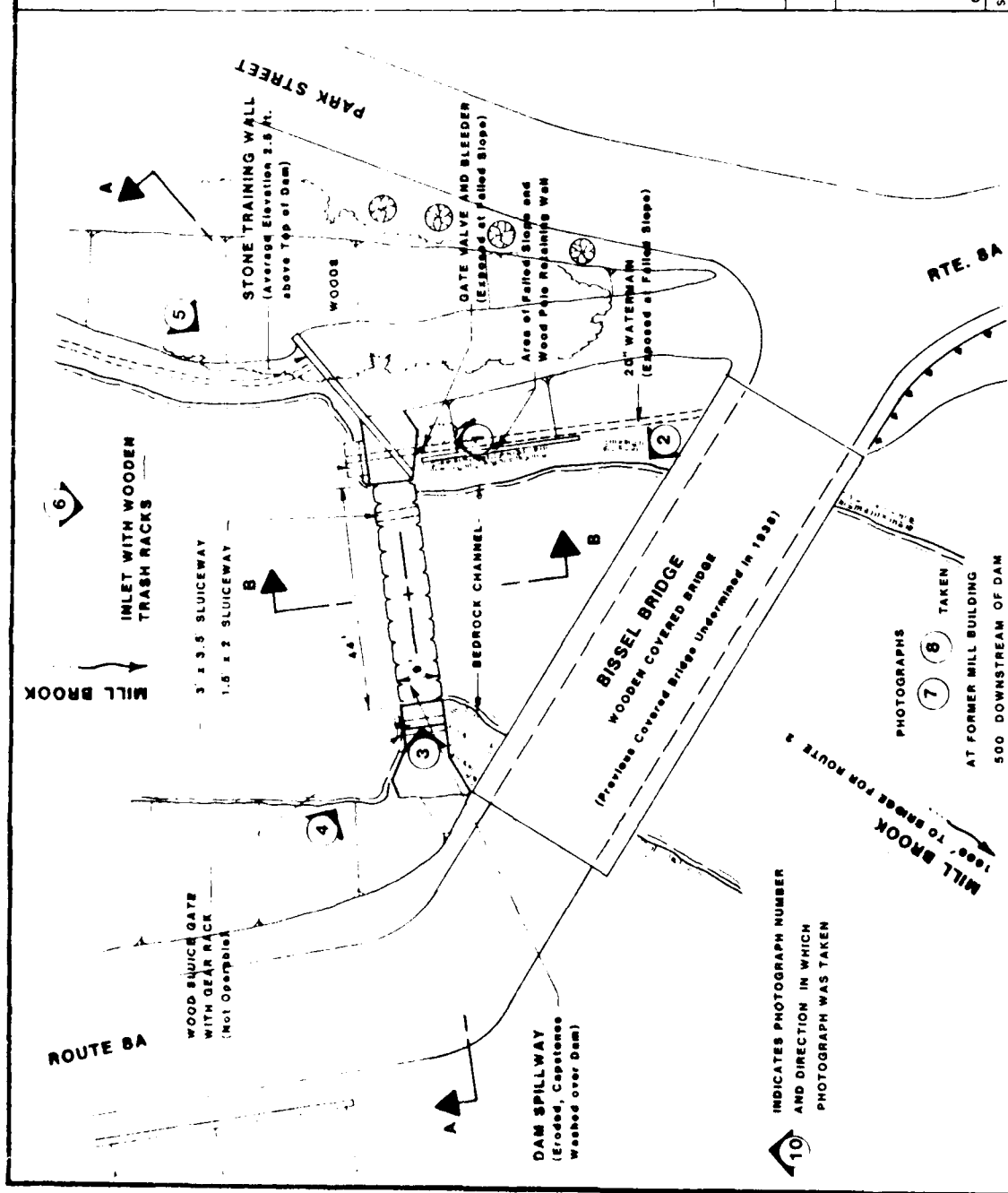
MILL BROOK

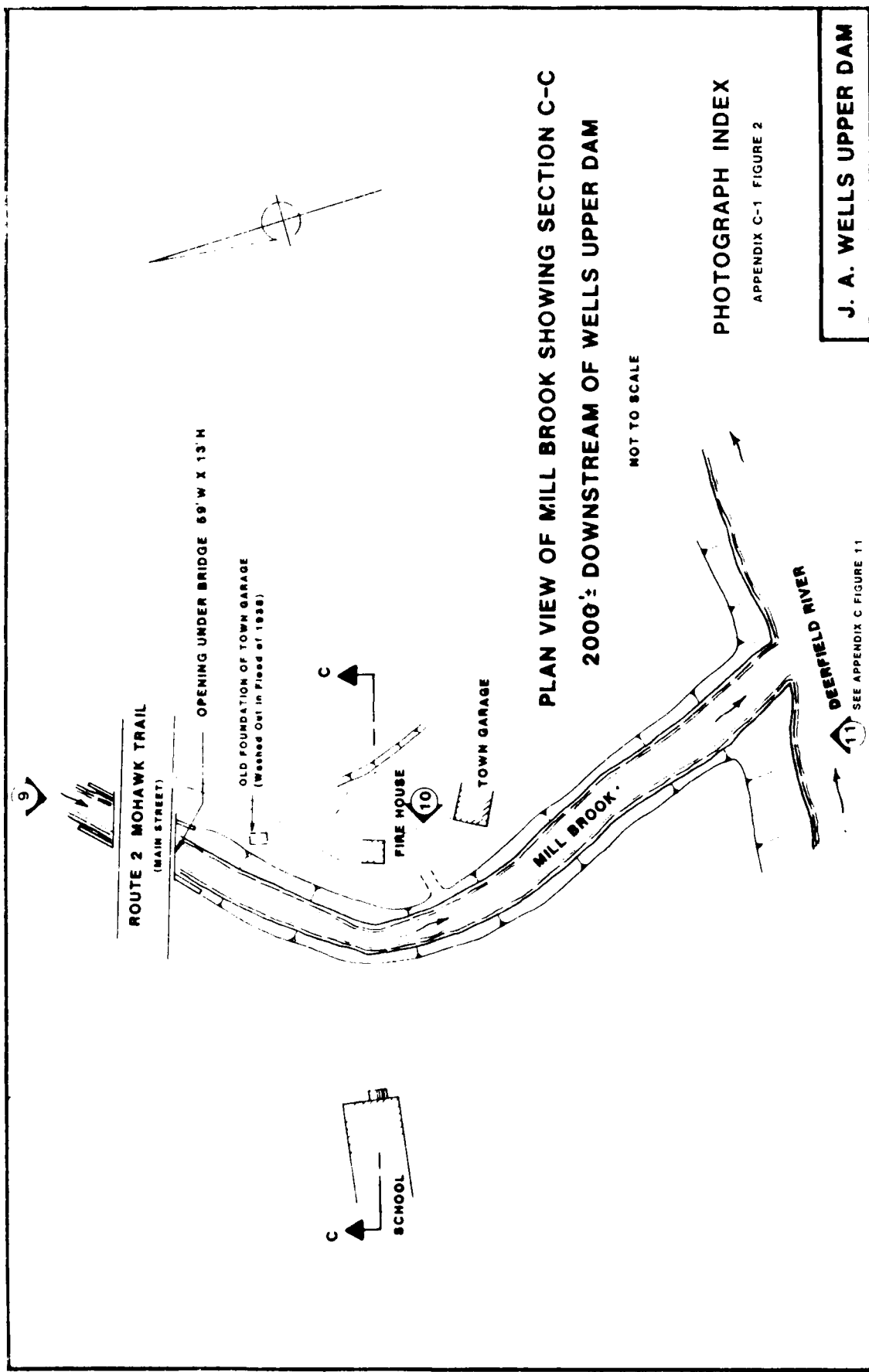
MASSACHUSETTS

DATE: JUNE 1980

CHARLEMONT

SCALE: NOT TO SCALE





PLAN VIEW OF MILL BROOK SHOWING SECTION C-C
2000'± DOWNSTREAM OF WELLS UPPER DAM

NOT TO SCALE

PHOTOGRAPH INDEX

APPENDIX C-1 FIGURE 2

J. A. WELLS UPPER DAM

SEE APPENDIX C FIGURE 11



Figure 1

View of southeast end of spillway showing erosion of crest. Note training wall on top of dam and 20 inch gate valve and timber pole retaining wall. A rock is resting on the 20 inch iron water pipe.



Figure 2 View of dam from downstream showing partial collapse of sluiceway at northwest end of dam. Note eroded spillway crest is causing water to be concentrated at southeast end. Dam is founded on bedrock. Stones in contact with bedrock are smaller in size near center of dam.

ISBN 14551 5531 5 (Hbk) £40.00 (US \$100.00)



Figure 3 - View of southeast end of dam showing eroded spillway crest, training wall and slope failure at abutment. Note exposed 20 inch water pipe and undermined timber pole retaining wall.



Figure 4

Operating mechanism for 3' 6" x 3' sluice gate at north-east end of dam. Note operator is broken above water level.



Figure 5 - View of northwest abutment. Note sediment in reservoir also note proximity of bridge abutment to top of dam. Overtopping of dam would jeopardize bridge abutment here. Also note trees and brush in top of dam.

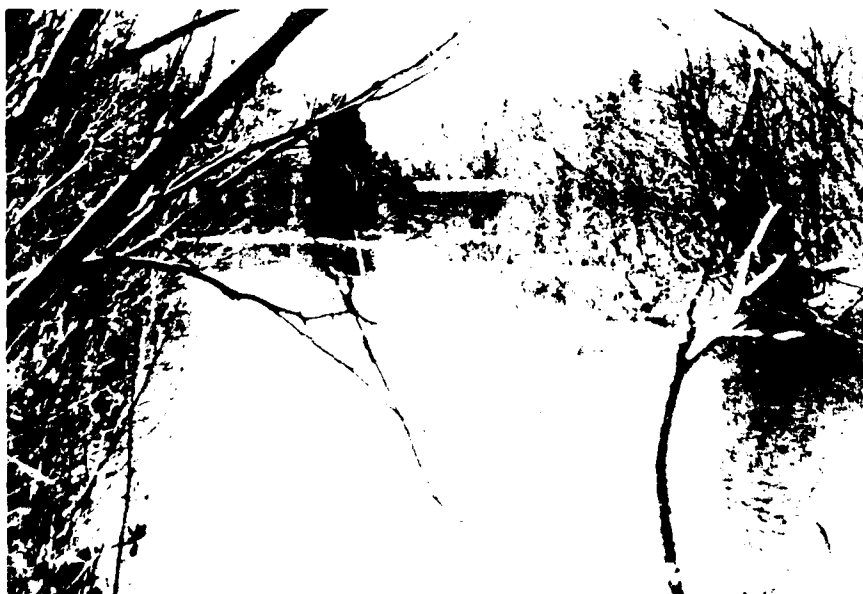


Figure 6 - View of northwest abutment. Note sediment in reservoir also note proximity of bridge abutment to top of dam. Overtopping of dam would jeopardize bridge abutment here. Also note trees and brush in top of dam.



Figure 7 - Former mill building now being converted into a residence 600 feet downstream of damsite. Note rock gorge to left of building.



Figure 8
Rock wall along left bank of
stream. Note that foundation will
be in the stream.



Figure 3 - Concrete bridge at Route 2 in the Village of Charlemont. Note fire station and town garage downstream of bridge to the left in photograph.



Figure 4 - View downstream from bridge at Route 2 in the Village of Charlemont. Note fire station and town garage downstream of bridge to the left in photograph.



Figure 11 - View of elementary school, town garage (brown building at right) and the fire station (red building at right). This area lies in the floodplain of the Deerfield River (foreground).

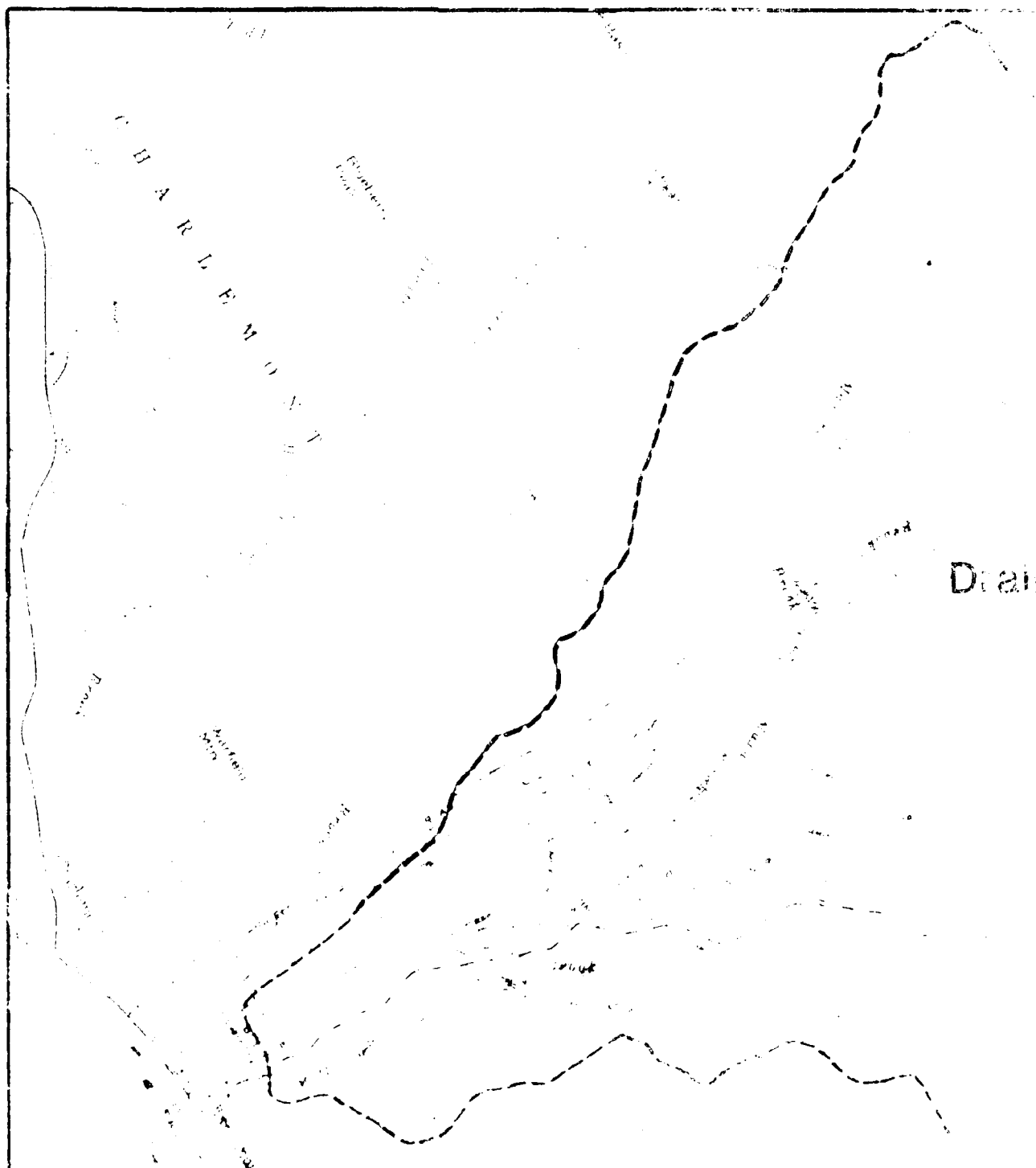
This photograph was taken looking across the Deerfield River from its southernly bank.

APPENDIX D

HYDRAULIC AND HYDROLOGIC COMPUTATIONS

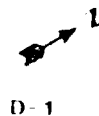
D-1. DRAINAGE AREA MAP

D-2. COMPUTATIONS



J.A. WELLS UPPER DAM

Identification No. MA 01268



North Quadrangle
Reno Quadrangle

1:25000

Drainage Area 12.1 Sq. Mi.

angle
angle

2002

JOB MA 1268 JA Wells Upper
SHEET NO 1 OF 13
CALCULATED BY JFC DATE 3/27/80
CHECKED BY clg DATE 5/5/
SCALE _____

2.A. Measurements

38.85' planimeter reading 1
77.70' " " 2
Topo 1" = 635.0 meters
1" = 403,226 m² = 99.64 Acres

Note MDPW Records show 10 Sq. Mi
Use 12.1 Sq. Mi

Calculate PMF using "Preliminary Guidance For Estimating Maximum Probable Discharges in Phase 1 Dam Safety Investigations" March 1973

Use value about $\frac{2}{3}$ distance between Rolling and Mountainous Curve for 12.1 sq. mi.

$$CSM_{PHE} = 1820 \checkmark$$

$$\therefore \text{PMF} = 1820 \text{ CSM} \times 12.1 \text{ Sq. M.} = \underline{22,022 \text{ CFS}}$$

$$\frac{1}{2} \text{ PMF} = 11,000 \text{ CFS}$$

$$1/4 \text{ PMF} = 5,500 \text{ CFS}$$

APPENDIX D-2

Robert G. Brown & Associates, Inc.
 Berkshire Common Third Floor North
 PITTSFIELD MASSACHUSETTS 01201
 (413) 499-1560

JOB MA 1249 N.A. WELLS DPEER
 SHEET NO 5 OF 15
 CALCULATED BY JFC DATE 4/20/80
 CHECKED BY RFW DATE 7/1/80
 SCALE _____

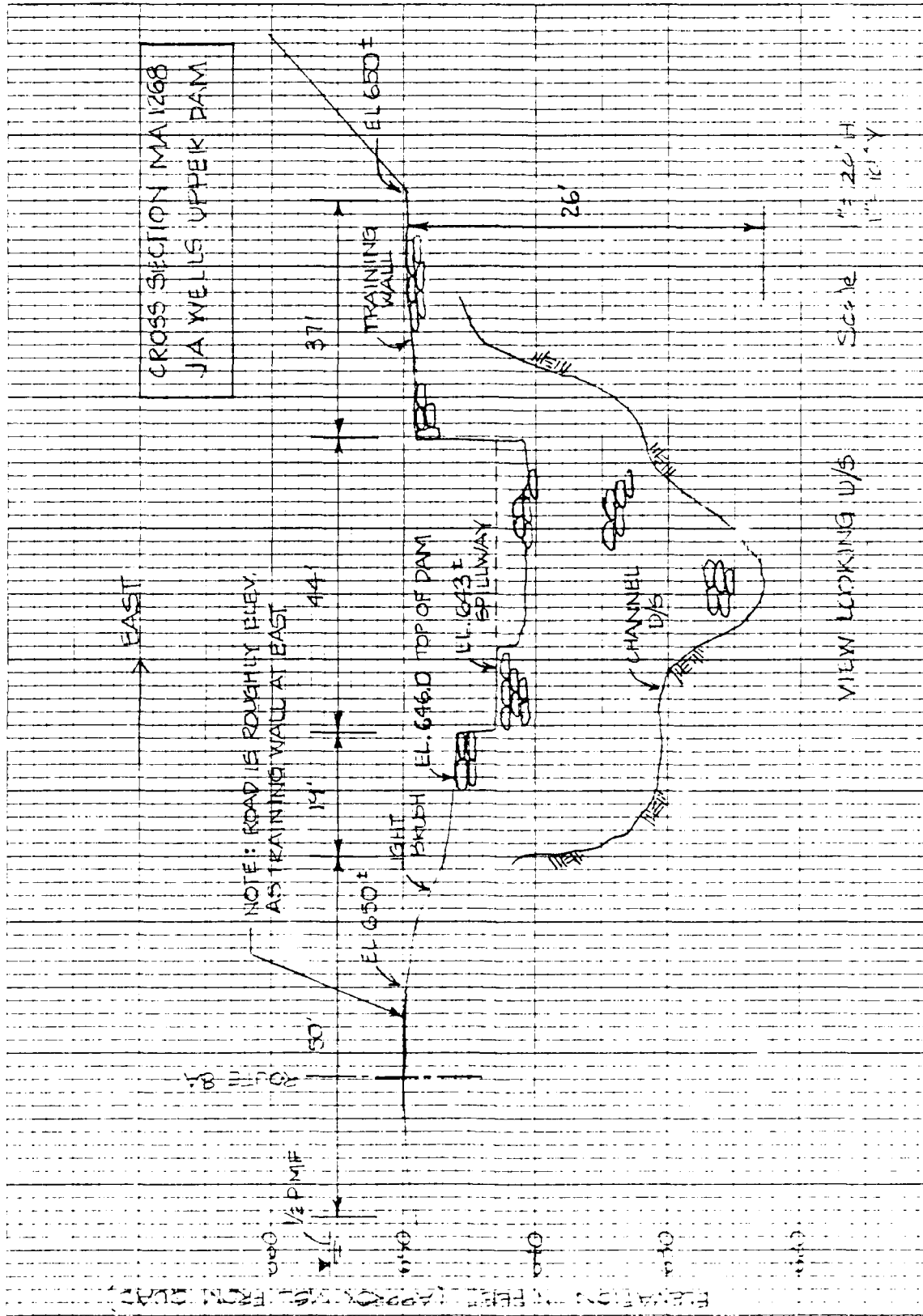
FLOW OVER SPILLWAY FLOW OVER DAM FLOW OVER FLOWLINE AND FLOW OVER FLOWLINE

ELEV.	C	L	H	Q	C	L	H	Q	C	L	H	Q	C	L	H	Q
643	3.3	4.4	0	0	2.8	19	0	0	2.6	87	0	0	2.6	87	0	0
646	"	"	3	754	"	"	4	426	"	"	2	630	"	"	2	630
650	"	"	7	2659	"	"	6	782	"	"	4	1510	"	"	4	1510
652	"	"	9	3120	"	"	8	1204	"	"	6	1682	"	"	6	1682
654	"	"	11	5217	"	"	10	1682	"	"	8	2211	"	"	8	2211
656	"	"	13	6806	"	"	12	2211	"	"	10	2211	"	"	10	2211
658	"	"	15	8435	"	"	15	8435	"	"	15	8435	"	"	15	8435

NOTE: ELEVATION DATA TAKEN FROM U.S.G.S. QUAD.

$$Q_{(CF)} = C L H^{3/2}$$

$$Q_{(658.5)} = 3.3 \times 44 (12.5)^{3/2} = 6417 \text{ cfs}$$



DISCHARGE RATING

MA 1268

J.A. WELLS UPPER DAM

1/2 PMF

EL. 655.5

1/4 PMF

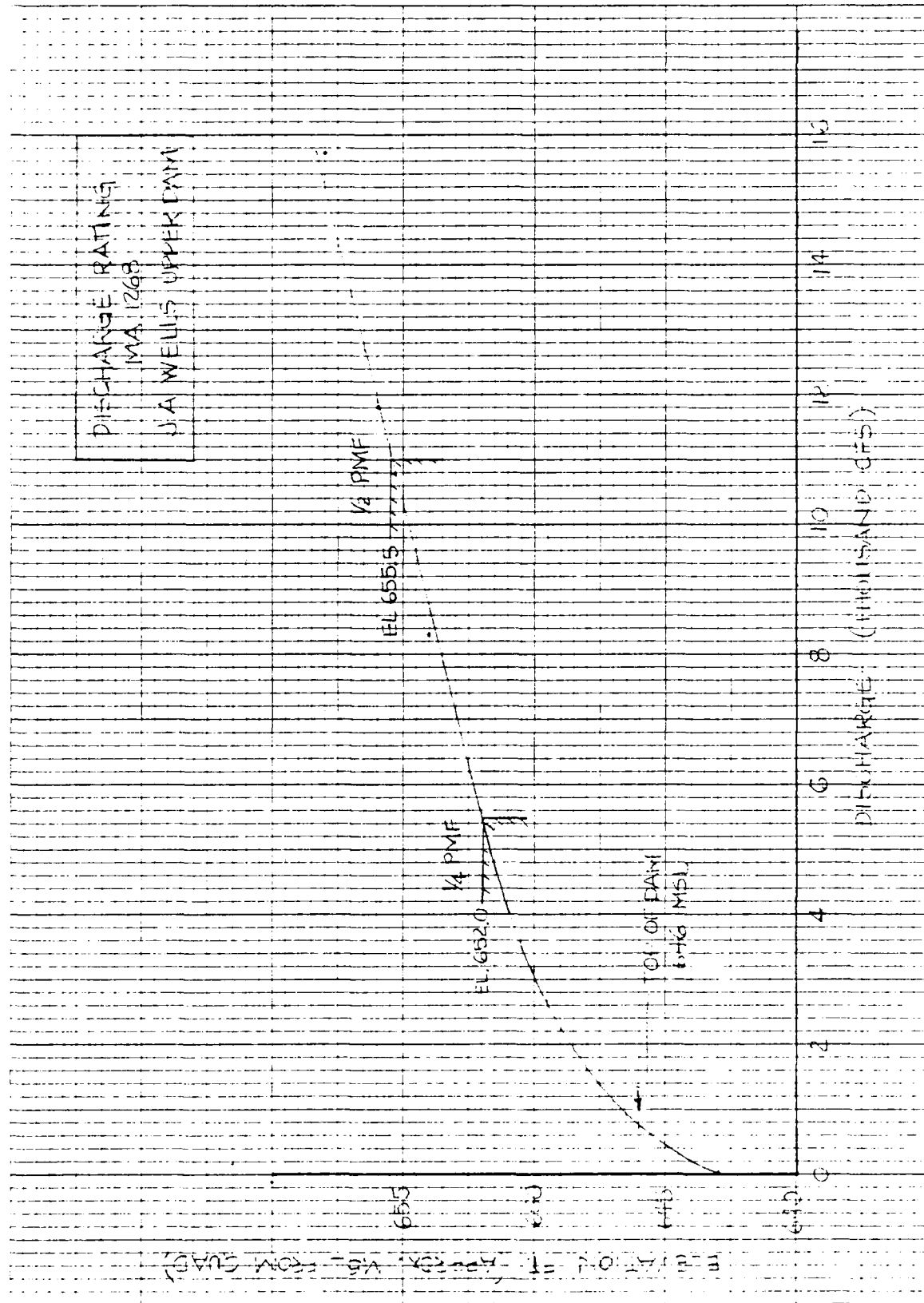
EL. 652.0

TOP OF DAM

EL. 646 MSL

DISCHARGE (THOUSAND CFS)

ELEVATION = 1' ABOVE K.B. FROM GRADE



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Berkshire Common Third Floor North
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(413) 499-1560

JOB MA 1268 JAWELLS UPPER
SHEET NO 6 OF 13
CALCULATED BY JFC DATE 4/15/80
CHECKED BY JFW DATE 7/10/80
SCALE _____

CONCLUDE REGARDING HYDRAULIC CAPACITY

TEST FLOOD $\frac{1}{2}$ PMF = 11,000 CFS

($\frac{1}{4}$ PMF = 5,500 CFS)

$\frac{1}{2}$ PMF TEST FLOOD ELEV. EL. 655.5

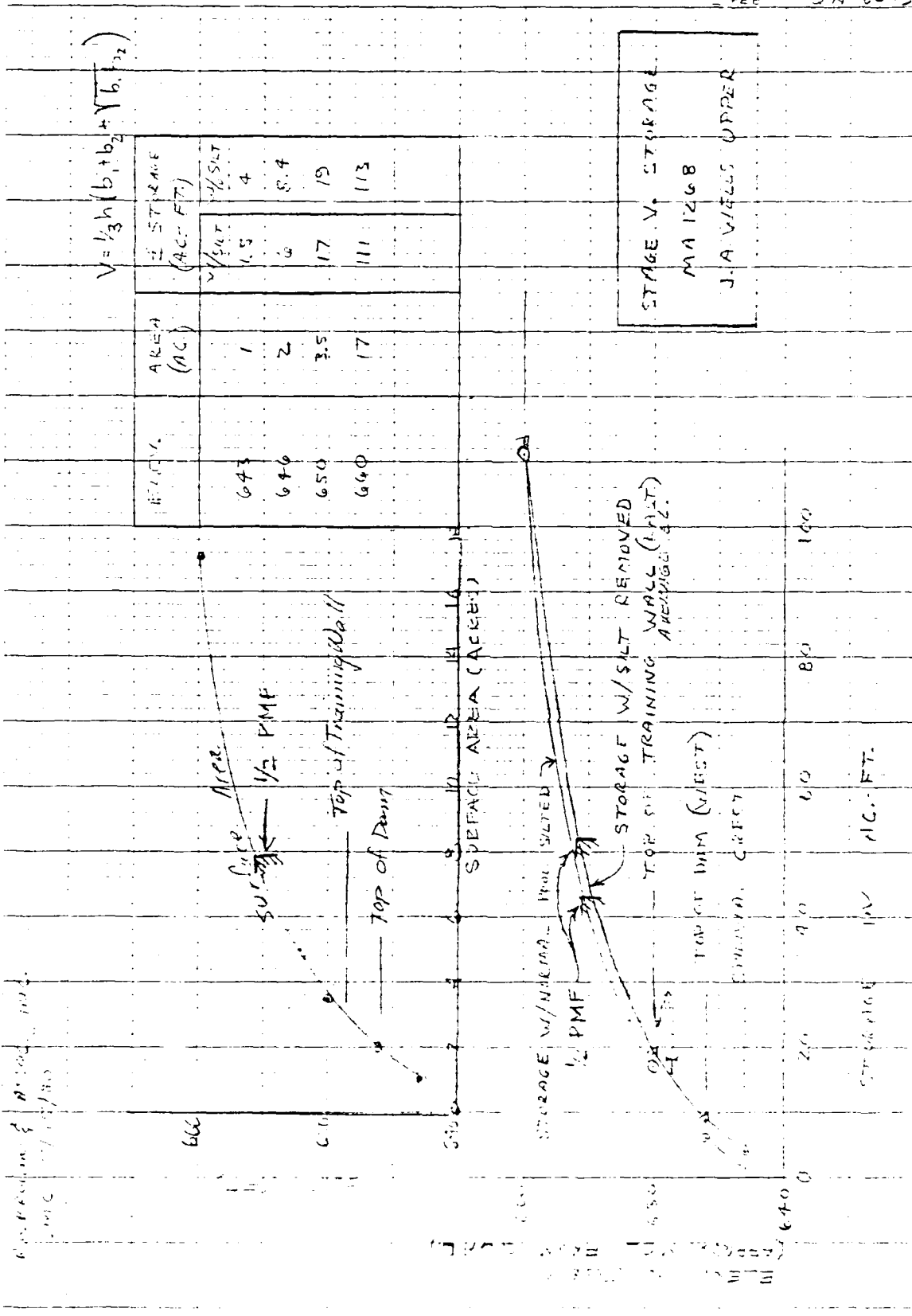
($\frac{1}{4}$ PMF EL. 652.0)

TOP OF DAM EL. 646.0

THEREFORE, DAM IS OVERTOPPED BY 9.5 FEET FOR $\frac{1}{2}$ PMF AND
6.0 FEET FOR $\frac{1}{4}$ PMF

SPILLWAY CAPACITY AT TOP OF DAM IS 700 CFS WHICH IS
7% OF TEST FLOOD DISCHARGE.

NOTE: DAM WAS OVERTOPPED IN 1938 ACCORDING TO LOCAL
RESIDENT. EXISTING COVERED BRIDGE IS A
REPLACEMENT OF BRIDGE WHICH WAS DAMAGED IN
1938 WHEN WATER WASHED OVER DAM AND
UNDERMINED BRIDGE ABUTMENTS.



$$V = \frac{1}{3} h (b_1 + b_2 + \sqrt{b_1 b_2})$$

HEIGHT	AREA (AC)	STAGE (AC-FT)	1/2 PMF
643	1	1.5	4
646	2	6	8.4
650	3.5	17	19
660	17	111	113

STAGE V. STORAGE
MA 1268
J.A. VIGGOS UPPER

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JOB MA 1263 J.A. Wells JMC
SHEET NO 7 OF 13
CALCULATED BY JFC DATE 4/30/80
CHECKED BY JMC DATE 5/1/80
SCALE

Downstream Hazard Area - General Description

Immediately downstream of the dam is the Bissell Covered Bridge which is a replacement of the covered bridge which existed prior to 1938.

Downstream of the covered bridge is an old mill which has recently been converted to a residence. The foundation of this structure is presently being attacked by the flow in the stream. Stream is in a steep rock gorge below dam & covered bridge.

Further downstream is a MDPW bridge at Rt. 2 this is in the Village of Charlemont and a number of structures are located in this area. Structures just upstream of the Rt 2 bridge are high above the stream.

Just downstream of Rt 2 is the town garage Fire St on the left bank and some residences on the right bank. Further downstream is the elementary school on the right bank. According to a local resident, previous structures in the area of the town garages were destroyed in 1938. Residences on the right bank received flood damage but remained after the flood. The elementary school was constructed during the 1950's.

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JOB MA 1268 J. A. WELLS UPPER
SHEET NO 8 OF 13
CALCULATED BY JFC DATE 1/20/80
CHECKED BY JEW DATE 2/13/80
SCALE _____

EXISTING COVERED BRIDGE WOULD BE SEVERELY DAMAGED BY OVERTOP OF DAM. BECAUSE BRIDGE IS HIGH ABOVE THE STREAM CHANNEL. AND ABUTMENTS ARE N EDESS. BREACH OF DAM WOULD PROBABLY NOT PRESENT AS MUCH DAMAGE POTENTIAL AS WOULD OVERTOPPING.

ANALYZE BREACH CONDITION AT OTHER DOWNSTREAM AREAS.

$$Q_p = \frac{3}{27} w_b \sqrt{g} y_o^{3/2}$$

WHERE w_b = BREACH WIDTH - USE 40% CREST AT MID HEIGHT
ASSUME FAILURE WITH WATER AT TOP OF TRAINING WALL

ELEVATION — EL. 650.0

$$y_o = 650.0 - 624 = 26'$$

$$w_b = 0.4 \times 70 = 28'$$

$$Q_p = \frac{3}{27} \times 28 \times \sqrt{32.2} \times 26^{3/2} = \underline{6241 \text{ CFS}}$$

Q THRU SPILLWAY OTHER THAN BREACH =

$$44' - 28' = 16', \quad -p = 7$$

$$Q = 3.3 \times 16 \times 7^{3/2} = \underline{975 \text{ CFS}}$$

Q OVER ENDS OF DAM —

$$Q = 2.5 \times 10 \times 2^{3/2}$$

$$Q = \underline{426 \text{ CFS}}$$

$$\text{TOTAL BREACH } Q = \underline{7245 \text{ CFS}}$$

$$\text{ANTECEDENT } Q \text{ AT EL. 650.0} = \underline{8100 \text{ CFS}} \quad (\text{FROM 650.0})$$

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JOB MA 1268 N.A. WEIRS PROP.
SHEET NO. 9 OF 3
CALCULATED BY JFC DATE 4/5/80
CHECKED BY EXM DATE 7/1/80
SCALE _____

RATE RT. 2 BRIDGE — LOW FLOWS BY MANNING EQU.

$$Q = \frac{1.49}{n} A R_h^{2/3} S_o^{1/2}$$

$$S_o = 0.07$$

$$n = 0.035 \text{ (BOTTOM)}$$

$$n = 0.02 \text{ (SIDES)}$$

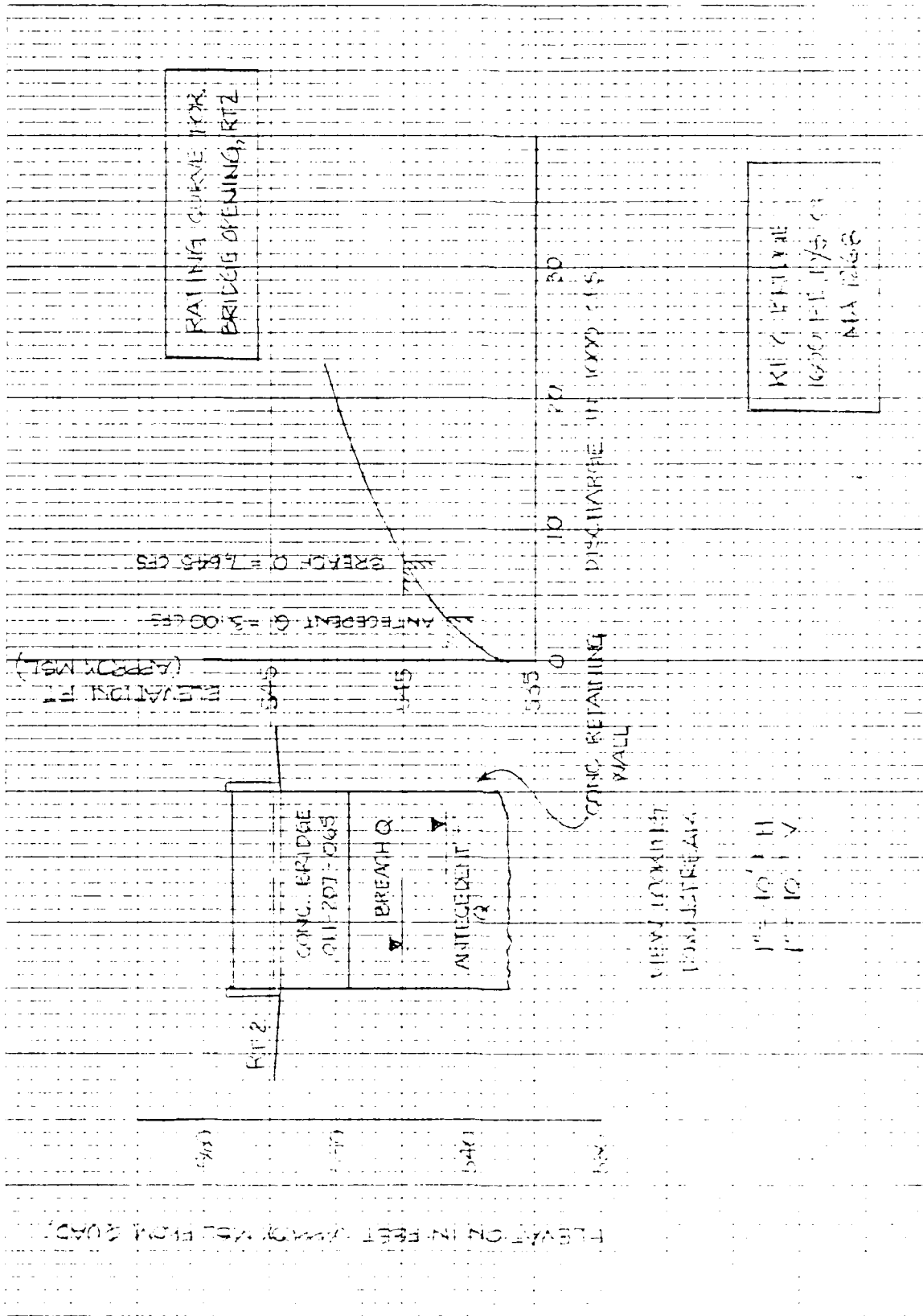
	ELEV.	AREA	W _{PER.}	Q _{CFS}
	537	0	—	0
(541)	540	30	66	2282
(546.5)	543	430	76	11450
(551)	549	720	84	23602

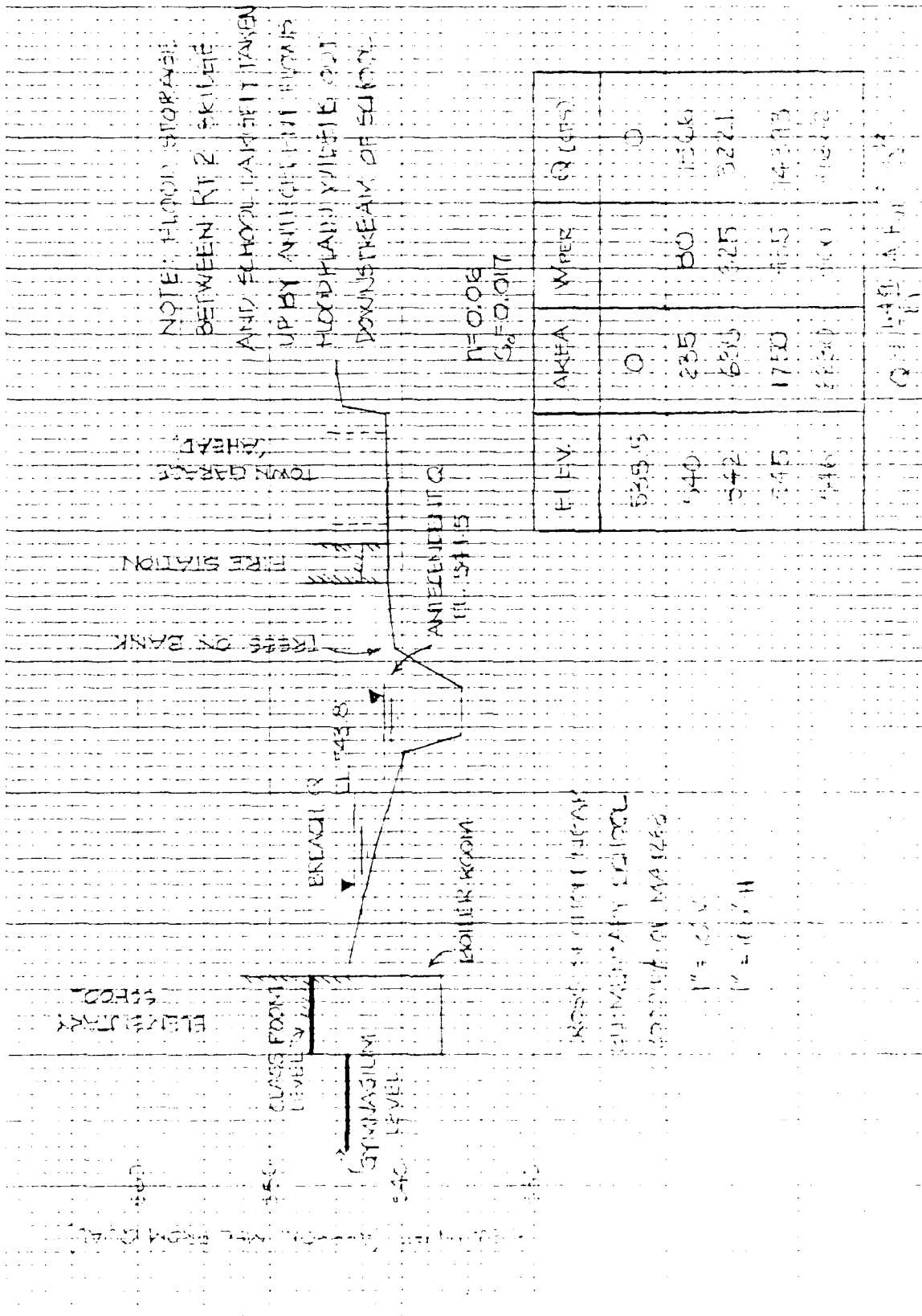
() = WITH CONSIDERATION FOR LOSSES. FLOW SEEMS
WELL DIRECTED INTO OPENING BY RETAINING
WALL UPSTREAM RT. BANK

NOTE: THIS RANGE OF FLOWS SUFFICIENT TO DESCRIBE
IMPACT OF FLOWS BEING ANALYZED.

BREACH Q = 7645 CFS

ANTECEDENT Q = 3100 CFS

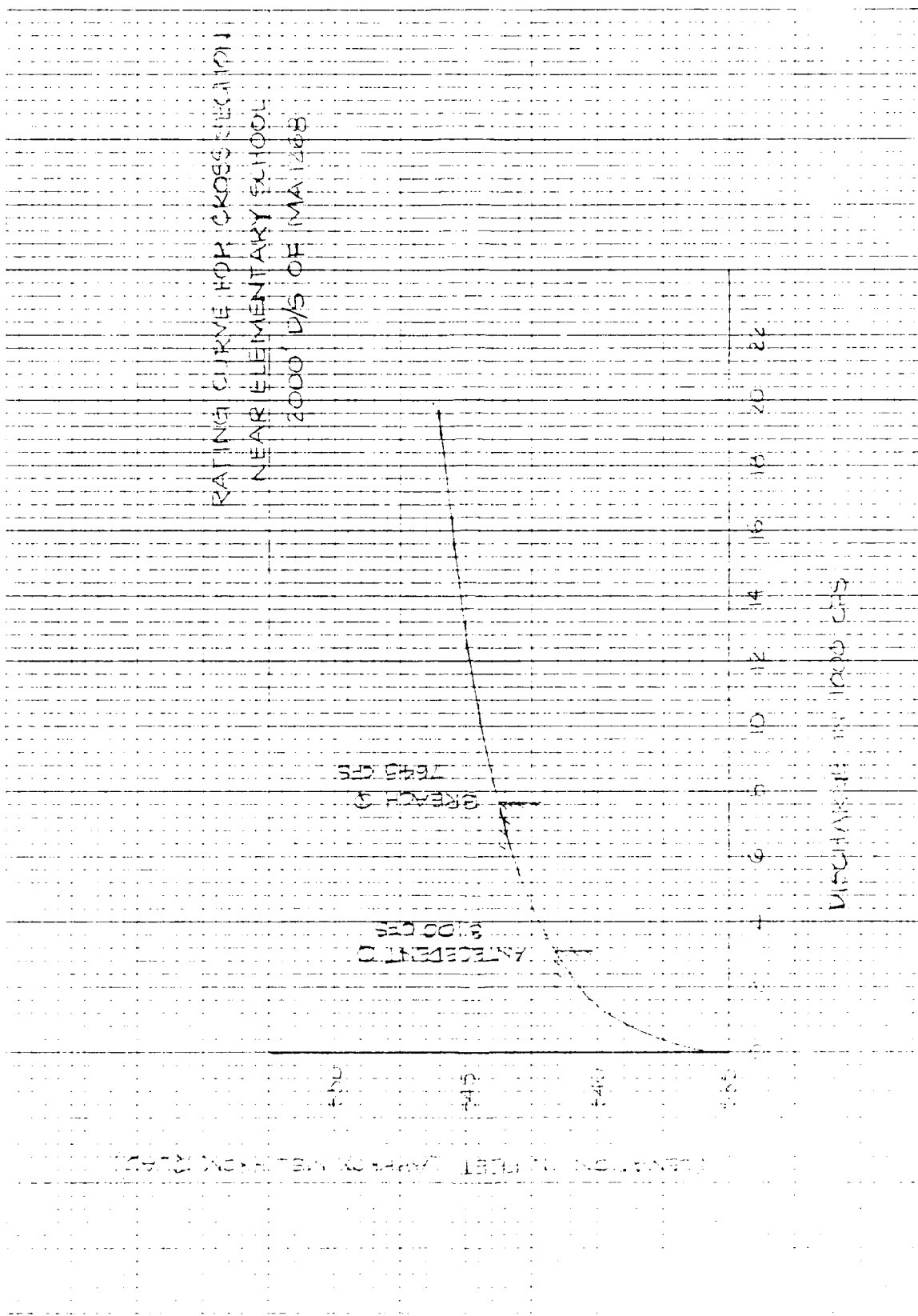




RATING CURVE FOR CROSS SECTION
NEAR ELEMENTARY SCHOOL
2000' D/S OF MA 1268

ANTICIPATED
3000 CFS
GRAVE 2
7643 CFS

DISCHARGE IN 1000 CFS



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(413) 499-1560

JOB MA 268 J.A. WELLS UPPER
SHEET NO 13 OF 13
CALCULATED BY JFC DATE 5/1/80
CHECKED BY JEW DATE 7/12/80
SCALE

Conclude Regarding Downstream Hazard:

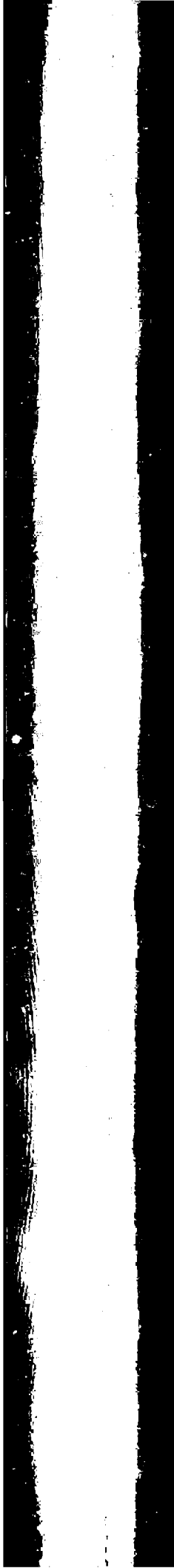
- 1) Breach of dam would wash out old mill just downstream of covered bridge. This mill has recently been converted into a residence. The existing foundation is currently being attacked by the stream and there is evidence of recent repair attempts.
2. Opening of Rt. 2 bridge is adequate to pass Breach Q, assuming no blockage.
3. Fire Station and Town Garage (essential municipal services) would be flooded by about 1 foot prior to breach. (Note - Former buildings in this area were destroyed in 1938 Flood, according to local resident.) Floodwave from Dam Breach would cause an additional 2 to 3 feet of flooding.
4. Prior to Breach, water in Mill Brook would be about 5 feet above the basement floor level of the school. The floodwave would cause an additional 2 to 3 feet of flooding, possibly causing the flood waters to reach the level of the school Gymnasium floor.

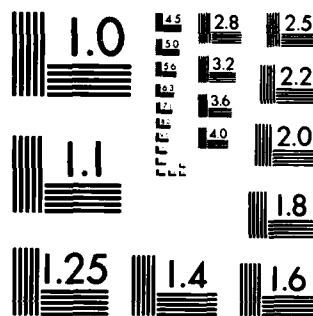
AD-A155 387 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS J A 2/2
WELLS UPPER DAM (U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV JUN 80

UNCLASSIFIED

F/G 13/13 NL







MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

APPENDIX E

**INFORMATION AS CONTAINED IN
THE NATIONAL INVENTORY OF DAMS**

100

[illegible]

POPULAR NAME	NAME OF IMPOUNDMENT
14 BELLS UPPER	WILL BROOK

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	WATERCOURSE	RIVER OR STREAM		NEAREST DOWNSTREAM CITY - TOWN - VILLAGE		DIST. FROM DAM (MI.)	POPULATION
01 10	MILL BROOK			CHARLEMONT		0	1050

(C)	(D)	(E)	(F)	(G)	(H)		
(A)	TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FEET)	HYDRAULIC HEIGHT (FEET)	STORAGE CAPACITIES	
						(B) MAXIMUM (ACRE-FT.)	(C) NORMAL (ACRE-FT.)
1950	S	26	26	16	15	NED N N	

REMARKS
SILTED IN WITH SILT REMOVED CAPACITY' 0.15AC-FT 25-DAM ON LEDGE 22EST

(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)	
D.S.	SPLWAY	MAXIMUM DISCHARGE (C.F.)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	PROPOSED (MW)	NAVIGATION LOCKS		
HAND	CULVERT (FEET)	WIDTH (FEET)				NO LENGTH WIDTH LENGTH WIDTH LENGTH WIDTH	YES LENGTH WIDTH LENGTH WIDTH LENGTH WIDTH	
1	95	40	600					

(a)	(b)	(c)
OWNER	ENGINEERING BY	CONSTRUCTION BY
WATERBURY FIRE DISTRICT		

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE

INSPECTION BY	INSPECTION DATE			AUTHORITY FOR INSPECTION
	DAY	MO	YR	
ROBERT G BROWN & ASSOC INC	09	MAY	90	PL 92-367

(4)	REMARKS
22-NT3°	29-UPSTREAM OF VILLAGE

END

FILMED

7-85

DTIC



